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3rd International Congress of Physical Medicine
IIIe Congres international de Medecine Physique
3° Congreso internacional de Medicina Fisica
3. internationaler Kongress für Physikalische Medizin

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ARCHIVES OF *Physical Medicine and Rehabilitation*

OFFICIAL JOURNAL

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AMERICAN ACADEMY OF PHYSICAL MEDICINE AND REHABILITATION



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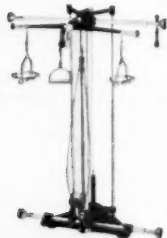
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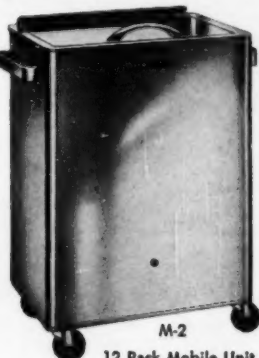


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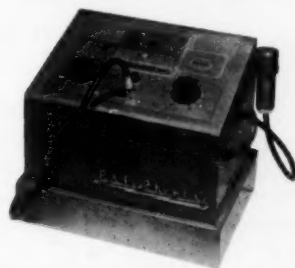


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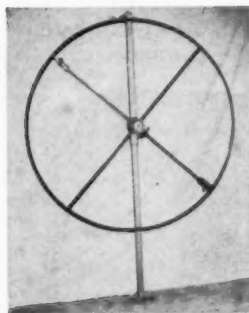
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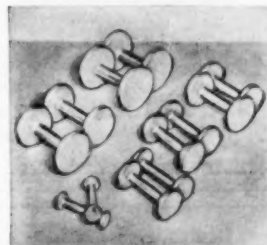
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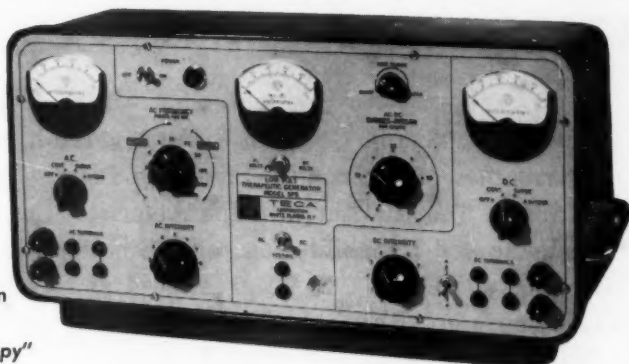
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3. The essay must not have been published previously.
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5. The winning contribution will be determined by the Program Committee of the 3rd International Congress of Physical Medicine.
6. All contributions will become the property of the American Congress of Physical Medicine and Rehabilitation and will be released to the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION for publication as determined by its Editorial Board.
7. The winning essay will be presented at the meeting of the 3rd International Congress of Physical Medicine.

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Neurosurgical Relief of Intention Tremor Due to Cerebellar Disease and Multiple Sclerosis

Irving S. Cooper, M.D.
New York City

● Intention tremor may be relieved by chemothalamectomy. The lesion produced is in the medial portion of the ventrolateral nucleus of the thalamus. This lesion apparently interrupts nerve fibers entering the thalamus from the globus pallidus, red nucleus, cerebellum, and probably also the vestibular nucleus. Relief of intention tremor has been maintained for as long as one year. Moreover, intention tremors of such varying etiology as familial cerebellar degeneration, severe intracranial trauma, toxic hepatocerebral disease, and multiple sclerosis have been alleviated by this procedure.

During the past seven years an investigation of the affects of various basal ganglia operations for the relief of diverse involuntary movement disorders has been carried out at the St. Barnabas Hospital and New York University-Bellevue Medical Center.¹ During the course of this investigation more than 1,100 basal ganglia operations have been performed for the relief of resting Parkinsonian tremor, rigidity, dystonia, and other involuntary movements. The principle involuntary movements studied in this series have been the rigidity and resting tremor of Parkinsonism, as well as the grosser postural deformities and hyperkinetic phenomena of dystonia.

Parkinsonian tremor, which is present when the involved extremity is at rest, often disappears when the extremity performs a voluntary motor act. However, dystonic hyperkinesia, although frequently present when the extremity is at rest, is sometimes aggravated by intentional activity, particularly of a weight-bearing or a postural variety. Despite these apparent differences in the resting tremor of Parkinsonism and the postural involuntary movement disorders of dystonia, both of these involuntary movements can be relieved by surgery of the basal ganglia. Moreover, the relief of Parkinsonian tremor in this series has now endured for more than six years in the earlier cases and successful alleviation of dystonic manifestations has been followed in the earliest cases for more than three years.

It has been generally agreed that the tremor observed in cerebellar degenera-

tive diseases, in some cases of cerebellar tumor, and in multiple sclerosis is different from either the tremor of Parkinsonism or the involuntary movements of dystonia. Cerebellar tremor is usually not present when the involved extremity is at rest, but appears only when the extremity is used for a voluntary motor act, such as lifting a glass of water, attempting to write, or performing some other purposeful movement. Thus, this tremor appears on intention, thereby deriving its name as intention tremor as differentiated from resting tremor. The well-known clinical test for this type of tremor is the finger-to-nose maneuver, in which the tremor appears in the patient's index finger, hand, and entire upper extremity as the finger approaches his nose, and often becomes violent in the final effort to place the end of the finger upon the tip of the nose. This type of tremor is not relieved by medication and has usually been intractable to any form of therapy. Attempts to rehabilitate patients with severe intention tremor have been futile because the very nature of this type of tremor causes it to be aggravated by physical activity.

A recent development holds promise of contributing to the eventual understanding of the mechanism of intention tremor, as well as for its therapeutic alleviation. During the course of our experience with basal ganglia operations for Parkinsonism, it was observed that, in some of the more severe cases, both intention tremor and resting tremor were present and that both types of tremor were relieved by chemothalamec-

Read at the Thirty-seventh Annual Session of the American Congress of Physical Medicine and Rehabilitation, Minneapolis, September 2, 1959.

Professor of Research Surgery, New York University Post-graduate School of Medicine; Director, Department of Neurosurgery, St. Barnabas Hospital.

This study was assisted by grants from the Sister Elizabeth Kenny Foundation and the Allan P. and Josephine B. Green Foundation.

tomy, which is now our procedure of choice for the relief of these symptoms. Furthermore, the same thalamic lesion is capable of relieving the posturally induced movement disorders of dystonia. It was therefore decided to select several cases of severe intention tremor (appearing *only* during voluntary motion of the extremities) for investigative chemothalamectomy.

The purpose of this report is to bring to attention the fact that pure intention tremor can be relieved by interruption of the cerebellothalamocortical pathway by means of a lesion placed in the region of the ventrolateral nucleus of the thalamus by the technic of chemothalamectomy. In our series of cases of Parkinsonian tremor we have been able to present documented follow-up studies of six years' duration without recurrence. However, for intention tremor our longest experience to date is limited to one-year followup of cases without recurrence. Moreover, it should be noted that this surgical investigation has been directed at a particular symptom, namely intention tremor. In cases in which this symptom was the sole abnormality, neurologic function could be restored to normal. On the other hand, in patients in whom multiple symptoms exist, such as in multiple sclerosis, chemothalamectomy has relieved intention tremor without inflicting any neurological deficit in its place. Nevertheless, diverse symptoms of multiple sclerosis, such as nystagmus, spasticity, and slurred speech, have not been affected by this type of surgical intervention.

Material and Methods of Investigation

During the past year, six patients with severe incapacitating intention tremor of diverse etiology have been subjected to chemothalamectomy. In each case the intention tremor had been present without remission for several years. In each case the preoperative and postoperative evaluation of the investigative subject was performed by a competent neurologist or neurosurgeon, generally one who had had an opportunity to follow that particular case for several years prior to

operation. The etiology of intention tremor in these cases was severe brain trauma, one case; combined hepato-cerebral disease, one case; degenerative cerebellar disease, two cases; and multiple sclerosis, two cases.

The surgical technic applied in these cases is similar to that which has been employed for the relief of Parkinsonian tremor. A special cannula with a small balloon at its tip is placed in the brain in the region of the ventrolateral nucleus of the thalamus. When its position is corroborated roentgenographically, the balloon is inflated by the injection of 0.5 cc. of 55% of diatrizoate (Hypaque). This produces a reversible lesion in this area of the thalamus. During the production of the reversible lesion, the patient, who is conscious, is examined and the effect of this temporary lesion on intention tremor is observed.

When the balloon has been properly positioned, its inflation and the subsequent reversible lesion produced will produce instantaneous abolition of intention tremor. Thus, the site of the lesion must be chosen by roentgenoanatomic methods of localization and corroborated by physiologic clinical testing of a reversible lesion in a conscious, cooperative patient. As in other hyperkinetic disorders, we have found in this small series of cases that the effective lesion within the thalamus may vary from case to case in its position. Therefore, it is essential that the surgical technic employed provide for the production of a temporary or reversible lesion which can be tested clinically and physiologically before a permanent lesion is created.

The lesion which has been found to alleviate intention tremor interrupts fibers entering the thalamus from the globus pallidus, red nucleus, and cerebellum. Probably the vestibulothalamic fibers are also interrupted. The fact that so-called cerebellar tremor can be alleviated by interrupting fibers of the cerebellar system may at first seem surprising. However, it should be borne in mind that it has been proved beyond question that Parkinsonian tremor, generally acknowledged to be a basal ganglia or extrapyramidal phenomenon, is consistently

relieved by basal ganglia surgery. Considerable evidence has accumulated in the course of physiologic operations upon the central nervous system which indicates that a partially damaged system may produce more abnormal symptoms than a totally damaged system, particularly if compensating mechanisms exist in one or both cerebral hemispheres. Inasmuch as many otherwise incapacitated patients can be made accessible for rehabilitation by the removal of hyperkinetic symptoms, this concept of the adverse symptoms caused by a partially damaged neural system being relieved by a more completely damaged system, thereby allowing compensating mechanisms to function, is an important one not only to the neurophysiologist and neurosurgeon but to anyone interested in the overall concept of functional rehabilitation.

Results

In each of the six patients chosen for this study by virtue of their incapacitating intention tremor, virtually complete relief of this type of tremor was obtained by chemothalamectomy. There was no surgical complication or adverse sequelae in any case. However, one patient died of agranulocytosis of undetermined etiology two months following operation. The remaining five patients have been relieved of intention tremor from the time of surgery up until the present time, the period varying from three months to one year.

As an illustrative example of the alleviation of incapacitating intention tremor by this method, the following case report may be cited.

Case Report

A 66-year-old unemployed white male was selected for this surgical investigation by Dr. Robert Schwab of the Massachusetts General Hospital. The patient had onset of tremor in both hands in 1932. This tremor was present on motion of the extremities but not at rest. Shortly thereafter the patient's head began to shake. The head tremor and intention tremor of the upper extremities pro-

gressed rapidly so that by 1938 it had incapacitated the patient. Although his psychologic, intellectual, and general neurologic functioning other than tremor was not affected, the tremor became so severe that the patient became disabled and could not carry on gainful employment. Furthermore, he required assistance in all activities of daily living. Tremor during attempts at voluntary movement became so severe that he could not dress himself, nor could he feed himself. For ten years prior to operation, the patient was obliged to eat his meals from a dish without the use of his hands, in a fashion similar to that employed by a dog.

Dr. Schwab selected this patient, who had been under his observation for many years, as having the most severe intention tremor, and as being incapacitated by this symptom for the longest time in his experience. It was agreed that this patient could provide an objective, critical case for evaluation of the possibilities of relief of severe, long-standing, incapacitating intention tremor of cerebellar origin.

Chemothalamectomy was performed in February, 1959. The balloon cannula was placed within the thalamus in a plane 12 mm. anterior to the center of the pineal gland and 13 mm. lateral to the midline. When the balloon was distended with 0.5 cc. of Hypaque the patient was able to move the contralateral right side without any evidence of intention tremor. This symptom persisted, however, in the nonoperated left extremities.

During the first two postoperative days a total of 1.2 cc. of absolute alcohol combined with 0.2 cc. of pantopaque (iopendylate) was injected to the site of the temporary lesion, thus providing a permanent destructive lesion in this portion of the thalamus. The patient was ambulatory 48 hours after surgery and has been independent in his activities of daily living and completely free of any evidence of intention tremor of the right extremities since the time of operation.

This patient was re-evaluated by Dr. Schwab three months following surgery.

He reported as follows: "The right hand now shows superior strength during ergographic performance than it did five years before surgery in 1954. There is no evidence of pyramidal tract involvement in the right arm or leg as a result of the surgical lesion. The gross intention type of tremor which made it impossible for him to feed himself, write, or use his hand in any efficient manner is no longer present. There are no other cerebellar signs and no nystagmus. There is no sensory loss. The cerebellar intention movements on the left unoperated side remain the same as before. He gives an excellent demonstration of his ability to lift a glass with his right hand to his lips and drink thereof. He is unable to hold the glass with his left hand. In testing with a glass full of water or paper clips his ability in this regard gives a very vivid appearance. I would regard him as a grade A result at the present time. The degree of relief is particularly spectacular even in this bilateral case because the free normal right arm is not interfered with by the movements of the left arm. His ability to do things with his right hand is spectacular. The electroencephalogram is perfectly normal and symmetrical. One of the most interesting parts of this result I believe is that the involuntary movements of Parkinson's

disease, dystonia, and cerebellar disease appear to have a point in the nervous system through which their symptoms are mediated that is common to all of them and destruction of which obviously eliminates the incapacitating movements. Both the patient and I are quite happy about his right arm and hand being normal."

Summary

Intention tremor may be relieved by chemothalamectomy. The lesion produced is in the medial portion of the ventrolateral nucleus of the thalamus. This lesion apparently interrupts nerve fibers entering the thalamus from the globus pallidus, red nucleus, cerebellum, and probably also the vestibular nucleus. Relief of intention tremor has been maintained for as long as one year, the present duration of this particular study. Moreover, intention tremors of such varying etiology as familial cerebellar degeneration, severe intracranial trauma, toxic hepatocerebral disease, and multiple sclerosis have been alleviated by this procedure.

Reference

1. Cooper, I. S.: Chemopallidectomy and Chemothalamectomy for Parkinsonism and Dystonia. *Proc. Roy. Soc. Med.* 52:47, 1959.

Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.



Important Announcement —

The next examinations, written and oral, of the American Board of Physical Medicine and Rehabilitation will be held in New York City, June 17 and 18, 1960. The final date for filing application is February 15, 1960. Write to the Secretary, Dr. Earl C. Elkins, 200 First Street S. W., Rochester, Minnesota, for application.

Survey of Recent Research Activities in the Rheumatic Diseases

Roger L. Black, M.D.
Bethesda, Md.

● Research in the rheumatic diseases has shown a remarkable growth curve over the past decade. This has been in part due to the stimulation furnished by the discovery of the remarkable effects of corticosteroids in these diseases, and in part due to the increasingly generous financial and other support furnished to investigators in this area of research by private and federal sources. For example, NIAMD support for research in this field increased from 48 projects in 1953 to 87 in 1956. Having equal importance with the increase in volume, the nature of research endeavor has shown a more sophisticated trend. Whereas in 1953 only 20 per cent of the activity was in the biochemical area; in 1956, 40 per cent of the projects were fundamentally of biochemical nature. Current research activity can be easily appreciated by a searching glance at the programs of the two American Rheumatism Association meetings held within the past year. In all, 70 papers were presented, 22 of which were devoted to a study of the fundamental properties of the protein substances present in some sera responsible for the production of positive lupus erythematosus, and rheumatoid factor tests. Another 30 per cent of these papers were devoted to the description of new and interesting facets of the clinical and pathologic features of the rheumatic diseases. Other papers were devoted to therapeutic, physiologic, and metabolic studies. Features of the more important of these research developments will be discussed in the survey.

In this survey of recent research in the rheumatic diseases, a broad inspection of current investigational activity will be made first and then certain of the significant developments will be examined more closely.

First, how is this rapidly increasing research activity financed? In figure 1 are listed some prominent sources of support, both governmental and private. The Arthritis and Rheumatism Foundation, at the top of the nonfederal list, was established in 1948 as a fund-raising agency for support of research and education in this field. The other nonfederal sources include university funds, private foundations, and individual gifts. Recently the very successful National Foundation for Infantile Paralysis reorganized, shortened its name to "National Foundation," and embraced the rheumatic diseases within its sphere of interest. Prominent among the federal sources of support are the National Institute of Arthritis and Metabolic Diseases, other Public Health agencies, the Atomic Energy Commission, and the military forces.

Funds available for research have increased greatly in the past decade. The Arthritis and Rheumatism Foundation,

for example, quadrupled its expenditures for research between 1950 and 1956. The national office of this agency grants fellowships for basic research; clinical research grants are provided by local chapters.¹

Congress has liberally supported research in recent years, providing funds for the National Institute of Arthritis and Metabolic Diseases² to offer research grants to educational institutions throughout the country. Submitted projects are evaluated by a nongovernmental group of scientists and clinicians, and grants are awarded to those whose projects are approved. The number of projects supported has increased from 48 in 1953 to 87 in 1956 and now 124 in 1958. Although the number of projects financed has remained fairly stable in most categories, including rehabilitation, epidemiology, diagnosis, and treatment, there has been a striking increase in the number of etiologic, pathologic, and biochemical projects receiving grants.

What has been produced with the assistance of this money and effort? Research reported to the American Rheumatism Association at its annual and interim sessions in 1958 revealed an inspired, imaginative, aggressive spirit prevalent among the individuals and teams presenting their work. The pie-shaped graph (fig. 2) represents a classification of this work divided into major areas of endeavor. Approximately a third of the papers presented during 1958 were devoted to various aspects of the abnormal globulins responsible for the rheumatoid factor or L.E. factor phenomena. Another third provided refreshing viewpoints of the rheumatic diseases as a result of careful, thoughtful

Read at the Twenty-first Assembly of the American Academy of Physical Medicine and Rehabilitation (Seminar on "Basic Research in the Collagenoses"), Minneapolis, September 1, 1959.
Clinical Assistant Professor of Medicine, Georgetown University, Washington, D. C.; Senior Investigator, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health.

observations of a clinical or pathologic nature. The remaining third of the papers were evenly divided among connective tissue studies, problems in uric acid metabolism therapeutics, and etiologic considerations.

Rheumatoid and L. E. Cell Factors

Some of the most significant advances have been made in the studies of the abnormal proteins present in the sera of rheumatoid arthritis and lupus erythematosus victims. Waaler³ is credited with first describing the enhancing effect of sera from rheumatoid arthritis patients on the agglutination of sensitized sheep

red blood cells. Rose⁴ and his co-workers elaborated upon this observation and a test of diagnostic usefulness resulted. Other modifications include the euglobulin test of Ziff,⁵ the latex fixation test, and the recent bentonite flocculation test.⁶ The rheumatoid factor is present in the sera of approximately 80 per cent of patients with rheumatoid arthritis in concentration sufficient to produce a positive test. This same factor is also present in the sera of some patients with systemic lupus erythematosus and scleroderma but is absent in patients with other forms of arthritis such as gout, osteoarthritis, and rheumatic fever.

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Fig. 1 — Sources of support for research in the rheumatic diseases.

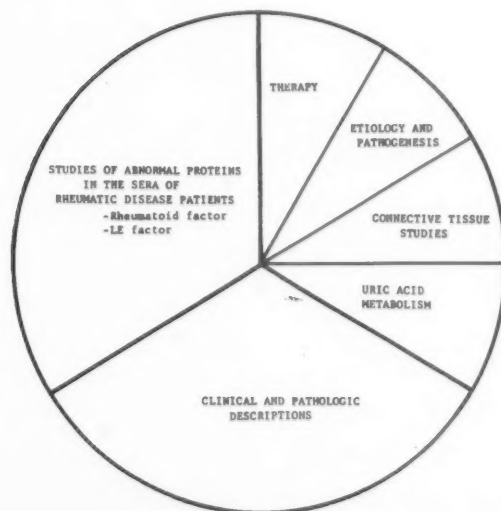


Fig. 2 — Research studies reported to the American Rheumatism Association, 1958, annual and interim sessions.

Physical-chemical technics have shown that this protein has electrophoretic properties of a gamma globulin, and has a high molecular weight of about one million compared to the usual gamma globulins with molecular weights of 150,000-300,000. Kaplan and Vaughan⁷ recently demonstrated this rheumatoid factor bound at scattered sites in rheumatoid synovial tissue, usually in a perivascular location. This demonstration of the abnormal protein at the disease site raises questions of its pathogenetic significance which are as yet unanswered.

The production of the L.E. cell, first described in 1948 by Hargraves and co-workers,⁸ has also received further elucidation. It would appear from the work of Kunkel and his group⁹ that patients with lupus erythematosus may have not just one but several factors capable of reacting with nuclear components. These workers, using complement-fixation technics, have demonstrated specific anti-nucleoprotein, antidesoxyribonucleic acid, and antihistone factors, as well as factors directed against whole nuclei. The L.E. factor responsible for the production of the L.E. cell appears as a gamma globulin with a sedimentation constant of 7 S.

Friou,¹⁰ using the fluorescent antibody technic of Coon, has developed and reported a new and sensitive test for lupus erythematosus. Serum containing the L.E. factor is added to a thin slice of tissue on the surface of a slide, incubated, and then washed off; the lupus factor is left bound to the nuclei of the cells on the tissue section. When fluorescent antihuman globulin is then added, a reaction occurs with the bound globulin L.E. factor, leaving the nuclei brightly visible under a fluorescent microscope. The L.E. factor activity can be titrated and the degree of positivity expressed as a function of dilution.

Clinical and Pathologic Descriptions

The need for careful clinical observation in medical research remains. Studies of this nature continue to make clearer previously unknown or poorly understood problems among the rheumatic diseases.

For example, the existence of synovitis due to sarcoidosis has recently been emphasized by Sokoloff and Bunim.¹¹ This troublesome manifestation has been reported in over 25 percent of patients with sarcoidosis, although often mistaken for other diseases, such as rheumatic fever. Polyarticular involvement, these authors point out, may be the first manifestation of sarcoidosis. Peripheral joints are the most often involved, especially fingers, wrists, ankles, and knees. Proof of the etiology, of course, rests upon histologic demonstration of the sarcoid granuloma in the synovium.

Similar clinical research is responsible for the evolution of the concept of arteritis as the basic lesion of rheumatoid arthritis. The demonstration of arteritis in rheumatoid nodules was accomplished by the same team.¹² Small arterioles with inflamed walls and fibrinoid deposits were found at the center of early subcutaneous nodules by tedious search of serial sections. In older nodules it was often difficult to find the diseased vessel. Similar arteritis, is, of course, found in diseased synovium and other tissue of rheumatoid arthritis patients.

Still other investigators^{13, 14} have been instrumental in the development of the concept of a specific heart disease due to rheumatoid arthritis. Foci of granulomatous inflammation, like that of rheumatoid subcutaneous nodules, have been found in all layers of the heart. The mitral and aortic valve leaflets and rings particularly are involved. Pericarditis is also commonly observed. Estimates of prevalence of this type of heart disease vary from 1 to 20 per cent of rheumatoid arthritis patients. The diagnosis is seldom made prior to post-mortem examination, however.

Orthopedic surgeons have long been aware of the pain-free spontaneous rupture of the extensor tendons in the hands of patients with rheumatoid arthritis. Ehrlich and his co-workers¹⁵ have recently described the pathogenesis of this disabling disorder in a careful study of a series of such patients. As this group pointed out, the basic lesion appears to be a destructive process in the wrist near the head of the ulna, resulting in an up-

ward displacement of the ulna at this point, with mechanical fraying of the extensor tendons. The lateral tendon is the first to rupture, with progressive loss of the fourth and then the third extensor tendons. The resulting deformity and loss of ability to extend the fingers has, on some occasions, been erroneously ascribed to primary disease of the metacarpophalangeal joints. The early recognition and correct interpretation of this disorder is important, since the lesion is amenable to surgical correction.

Other groups engaged in clinical research have been concerned with investigation of prevalence of rheumatoid arthritis. Kellgren's group,¹⁶ working in Great Britain, has found severe rheumatoid arthritis with clinical, radiologic, and/or serological evidence of the disease in 1 per cent of men and 3 per cent of women in a 55- to 64-year-old age group. This is in agreement with results of Cobb's group¹⁷ who found rheumatoid arthritis in 2.7 per cent of the population over 14 years of age in Pittsburgh. These and similar studies, yet to be performed in other geographic areas, will help to form a concept of the epidemiology of rheumatoid arthritis.

The observations itemized so far are only examples of the excellent work of clinical research in the rheumatic diseases. There is ample opportunity for new investigators and new projects in this field.

Research in Therapeutics

The application of physical medicine in the therapy of the rheumatic disorders is repeatedly emphasized even by clinical investigators reporting experiences with new therapeutic compounds. In the face of this emphasis, there is need for critical evaluation of the results of physical medicine in series of rheumatic disease patients.

Dr. David Fried¹⁸ is currently studying the use of resting, corrective, and functional casts in the treatment of patients with rheumatoid arthritis. The employment of resting casts for acutely inflamed joints has relieved pain in many of his patients. With rest, daily range of motion exercises are also employed, and no pa-

tient has developed significant contracture or ankylosis. He has also met with success in improving range of motion in severely restricted joints by the use of serial corrective casts. In many cases, where only one or two joints are involved, the use of a functional cast on a diseased wrist, an ankle, or a knee has enabled the previously disabled patient to return to useful employment.

Other research teams have been engaged in the evolution and evaluation of effective new anti-inflammatory compounds useful in therapeutics. As a result of the adverse side effects appearing in patients treated with cortisone and hydrocortisone, there was a need for a compound retaining the anti-inflammatory property, but free from the unwanted effects. The first advance in this area was the development of prednisone, an analogue of cortisone, with an unsaturated bond between carbons 1 and 2 in the A ring. This compound possessed an antirheumatic potency of three or four times that of hydrocortisone, yet failed to cause sodium retention in therapeutic doses, thereby reducing the incidence of edema as a side effect. Closely related corticosteroids, such as triamcinolone and 6-methyl prednisolone, soon were developed in the hope of reducing other side effects such as peptic ulceration, spontaneous fractures, or mental changes. Unfortunately, these side effects continued to appear. The most recent development has been dexamethasone, an analogue of hydrocortisone with anti-inflammatory activity of six to eight times that of prednisone. This compound also does not cause sodium retention. Studies show that it is potent in suppression of pituitary, adrenal, and thyroid function, and, like its predecessors, can impair glucose utilization. It has not been as frequently associated with peptic ulceration. The early appearance of facial rounding and deposits of fat about the neck and abdomen has been discouraging to some patients receiving this corticosteroid, but the relief of joint pain, swelling, and stiffness has prompted them to continue taking dexamethasone. Among 27 patients with rheumatoid arthritis receiving 0.5 to 4

mg. of dexamethasone daily for 8 to 18 months, we have observed significant functional improvement in 22.

Results thus far with these new analogues give encouragement to synthetic chemists seeking other molecular modifications in an attempt to divorce the anti-inflammatory effect from undesirable side effects.

In this discussion I have drawn upon only a few examples of current research activity in the broad areas of rheumatic disease investigation. There is much in rheumatology to challenge, to intrigue, and to inspire investigators with dissimilar and widely diverging interests. This is a desirable state of affairs, where so little is known and so much remains to be learned.

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when it is dark enough you can
see the stars. ♦ *charles a beard*

Physical Medicine and Rehabilitation in Law-Science: Its Value in Personal Injury Problems and Medicolegal Trial Technics

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Detroit

• The field of physical medicine and rehabilitation, by virtue of its extensive employment of objective technics, in the disturbances of the neuromusculoskeletal system, and associated diseases which require objective functional evaluation, offers the field of Law-Science the greatest opportunity for clarifying its many problems. The experience of the physiatrist in the use of the diagnostic and therapeutic measures defined in the objective tests such as the activities of daily living, range of motion testing, mechanical and myometer muscle testing, and with the extensive use of electronic recording devices and diagnostic medicine, permits the formulation of accurate and demonstrable information for legal judgment. By means of such methods as electromyography, chronaximetry, oximetry, circulation time testing and the like, it is possible to clarify the criteria proof necessary to govern the just appraisal and disposition of the various personal injury claims. Appropriate examples are presented in developing the criteria of the objective disability, capability, and the methods of evaluation to demonstrate the actual application in trial technics.

The specialty of physical medicine and rehabilitation, by virtue of its extensive employment of objective, evaluative and therapeutic technics in disturbances of the neuromusculoskeletal system and in associated diseases, offers the field of Law-Science the greatest opportunity for help in the clarification of its many problems. The experience of the physiatrist in the use of the diagnostic and therapeutic measures employed in objective testing for such functions as activities of daily living, range of motion, and manual and mechanical muscle condition, permits the formulation of accurate and demonstrable information for legal adjustment. Electrical sensing and recording technics, such as electromyography, chronaximetry, oximetry, electroencephalography, and electroretinography, make it possible to make objective the criteria of proof necessary to govern the just appraisal and disposition of various personal injury claims.

The major problem presented to the physiatrist and qualified adjudicating committee (lawyers, judges, claimant investigators, and so forth) is that of physical disability. Inability to work ranks high among the economic hazards of employees and their families. In a disability or impairment claim, the definition and the facts are frequently

blended. Against the contention of the disabling sickness or disability, the physician must decide whether the patient is or is not disabled and whether he is incapable of engaging in gainful work. Therein seems to lie the need for establishing practical concepts, in such manner as has occurred in the definition of chronic disability and chronic illness. There is a need for certain definition. In chronic illness, heart disease is ranked first, while in chronic disability, paralysis from brain damage is comparable. It becomes the responsibility of the physiatrist to elucidate the differences in meaning between permanent disability and permanent impairment.

By definition,¹ permanent disability is the alleged loss of ability because of impairment, to engage in faithful employment. From this, no fundamental or marked change in the future can be expected. The concept of permanent impairment is a medical one and refers to the anatomic or functional abnormality or loss proved after maximal medical rehabilitation has been achieved. It is stable or nonprogressive at the time of the evaluation. The evaluation of permanent disability is an appraisal of the patient's present and probable future ability to engage in gainful occupation, and is a nonmedical concept. The evaluation of permanent impairment is a medical function, being an appraisal of the nature and extent of the patient's illness or injury as it affects his personal efficiency in the activities of daily living. The determination of permanent impairment requires the skill of the physiatrist to determine the measurement of remain-

¹Read at the Thirty-sixth Annual Session of the American Congress of Physical Medicine and Rehabilitation, Philadelphia, August 28, 1958.

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ing function and evaluate the subjective factors related to employability.

The number of permanently physically handicapped individuals in the United States is between 4 and 5 million, of which about half are employable. About 800,000 persons become permanently disabled each year, through accident, illness or injury. The care of these individuals is usually accomplished through OASI (Old Age and Survivors Insurance — social security), federal and state afflicted-child and -adult legislation, or state accident or civil litigation claims. The determination of disability and capability is essentially the concern of medical rehabilitation. This is the province of the physiatrist.

History Taking

History is a necessary item. Without an adequate background of the causal agent and its contribution to the disability and impairment, an examination would be reduced to a worthless state. This history can usually be obtained from the patient, family physician, and close friends. These five factors must be determined in detail:

1. Capabilities prior to the injury.
2. Past history as it relates to previous illnesses, accidents, or operations. This may offer objective information pointing to an accident-prone individual.
3. Family background. Knowledge of chronic illnesses in the family, possible proneness to cancer, diabetes or tuberculosis is inestimable in clarifying problems of diagnosis.
4. Personal family background. This is the most important phase of history taking, in that it relates to the potential nervous problems to be encountered in the patient. An insecure person may have a feeling of being overwhelmed with the loss of any bodily defense (the injured part). Or, the inability to function in the future as he has in the past may result in severe depression. He may refuse to accept any substitute activities, further increasing reactive depression. Cosmetic changes, such as a limp or actual skin changes, may make him feel totally disabled in a social setting.

Finally, there may be an opportunity to flaunt ego prestige, so that the patient can show his physician, attorney, judge, and friends his presumed importance. This is probably the most important factor in litigation related to physical injury.

5. Work history. Information may usually be obtained from the patient as to the frequency of changing jobs, number of days lost from employment, personal habits at work, and concept of social responsibility.

It is distinctly necessary for the physiatrist to be a physician and record an accurate background history of the injury as well as of the patient. In this medicolegal evaluation, which should not be influenced by personal feelings, anamnesis is most important.

Physical Examination

Total physical examination is the function of the physiatrist. Disability and impairment can be determined only by means of a complete physical examination. When on the witness stand, the most capable physiatrist can be discredited as being an expert, if he has failed to take a blood pressure; hence, completeness in detail is necessary. Supplementary use of x-rays and examination of body fluids and body tissues make objective the presented information relative to disability.

Recording of Physical Findings. Physical examination findings should be recorded in detail. If a limited observation has been carried out, the systems not examined should be recorded very explicitly. As an example of method, discussion of a low back injury follows:

Inspection — Observe posture, stance, gait, movements about the room, lying or sitting attitude, appearance of spasm of muscles, scoliosis or lordosis, degree and manner of movements exhibited by patient while being examined. Palpitation should be for tenderness and muscle spasm. Experience of the examiner will permit objective observation as to the focalization of the tenderness and muscle spasm. Objective tests such as circumferential and linear measurements, neurologic signs (reflexes, motor power, sensory change for atrophy and shortening) are done by the physiatrist, with consultation if necessary by the associated specialties.

Roentgenographic Examination. Roentgenographic examination is the major objective procedure, and will not be discussed in this paper. Physical examination ranks equal in importance with this procedure.

Body Fluids. Examination of body fluids must be thorough. Knee paracentesis, spinal fluid survey, complete blood count, urinalysis, saliva, fecal material, lacrimal secretions, and vaginal discharge all afford basic information in testing. The synovial fluid examination can be done with a special needle, so that synovial biopsy is simultaneously performed. Spinal fluid protein changes and hydrostatic pressure are informative as to canal compression.

Biopsy. Biopsy is of value in the synovia in muscles for myopathic changes and in case of suspected malignancies. The effect of trauma in cancer is a subject of considerable litigation at present; hence, a metastatic malignancy as proved by biopsy may save considerable medico-legal effort.

Physical Medicine and Rehabilitation

The major contribution of physical medicine methods to legal medicine is the objectivity utilized accurately and uniformly to measure impairment and disability. When combined with capability determination, basic information is provided.

Mensuration. Mensuration should always be with a steel tape. This is necessary to prevent plaintiff or defendant counsel from attempting to disallow findings because "the tape stretches." Circumferential measurement should be clearly described and should originate from anatomic landmarks. Both sides should always be compared at corresponding levels. In the upper extremities, the physiatrist should measure 6 inches below the acromial process of the scapula, 5 inches above and below the olecranon process of the elbow, through the styloid processes of the wrist, and through the palm of the hand. In the lower extremities, he should measure 6 inches above and below the middle of the patella, measure the ankle through the malleoli

and just above the malleoli, and measure through the dorsum of the foot at the tarsometatarsal junction. Linear measurement for limb length should utilize the same type of landmarks, anterior superior spine, umbilicus, and so forth.

Range of Motion Testing. Range of Motion Testing is entirely objective if carried out by an experienced physician or under his direction by a physical or occupational therapist. The only technical tool required is a modified protractor, that is, a goniometer. Measurements should be compared simultaneously with the contralateral part. Positioning is at neutral and in the maximum passive range of the joint, with the goniometer placed parallel to the long axis of the bone. Where additional movement occurs due to the joint structure, that fact should be noted. However, the experience of the physiatrist in terms of his own values of range of motion is most important in final interpretation.

In my own program, the following values are used:

1. **Shoulder:** abduction to 180 degrees with scapular motion; flexion to 180 degrees, extension to 40 degrees; inward rotation to 90 degrees; outward rotation to 90 degrees. Adduction and elevation and depression are merely noted but not measured.

2. **Elbow:** flexion to 140 degrees; extension to 0 degrees. Forearm pronation and supination to 90 degrees.

3. **Wrist:** extension to 70 degrees; flexion to 90 degrees; radial deviation to 30 degrees; ulnar deviation to 50 degrees.

4. **Fingers:** Thumb abduction to 50 degrees, flexion of proximal phalanx to 70 degrees, flexion of distal phalanx to 90 degrees, thumb opposition to respective finger. Fingers termed 1, 2, 3, 4. Measured at metacarpophalangeal joints (MCP) to 90 degrees flexion and zero extension. Proximal interphalangeal joints (PIP) to 90 degrees and 110 degrees. Distal interphalangeal joints (DIP) measured to 90 degrees flexion. The latter two also have a normal of zero degrees extension.

5. **Hip:** abduction to 50 degrees; flexion to 120 degrees; external rotation to 60 degrees, and internal rotation to 30 degrees. Extension and adduction are noted but not measured.

6. **Knee:** flexion to 135 degrees and extension to zero degrees.

7. **Ankle:** dorsiflexion is to 20 degrees, and plantar flexion is to 45 degrees; inversion is to 30 degrees and eversion is to 20 degrees. Toe functions are only important in the big

toe, but are infrequently encountered, hence only noted but not measured.

8. *Cervical spine*: rotation to the right and left to 90 degrees; left and right rotation plus elevation to determine spasm of anterior scalenes and sternomastoid muscles. Check wrist pulsations simultaneously by oscillometer. Flexion and extension is 90 degrees.

9. *Lumbodorsal spine*: rotation to the right and left to 30 degrees; lateral bending to the right and left to 20 degrees; flexion to 90 degrees; extension to 30 degrees. All movements are done in the upright position. Straight leg raising is done in supine position.

The procedure is simplified in execution and requires little time in recording and interpretation. All movements are passive ranges of motion, and the clinical significance is either muscle spasm or joint limitation (bony or fibrous). These factors are the ones most frequently questioned in the medical report or on the witness stand.

Myometric Testing. The correlation of the myotomes and neurotomes is more important than the functional classification (flexors, extensors, etc.). The basic muscle distribution groups the neck and back muscles with the lower extremities and the shoulder shruggers with the upper extremities. In the manual muscle testing, so frequently used, much subjective judgment is interwoven with the findings. Hence, the Newman myometer is most frequently used to supplement and replace the manual muscle testing method. The myometric testing device, utilizing a spring and a scale, is numerically more accurate than manual methods but still entails a considerable subjective factor. However, recording in pounds is better understood by lawyers, judges, and juries than the scale of N, G, F, P, T, O. Electrical sensing and recording devices by Beasley and the myodynograph with its manual force gauge or axial tensiometer are more quantitative in type. However, much remains to be simplified before such apparatus can be used clinically.

Activities of Daily Living. Activities of daily living are not only functional tests, but also afford the best objective information relative to performance. This method tests disability and also tests the residual abilities, so as to permit good

evaluation of the physical problem. Many methods have been described over the years, but the present emphasis is on physical ability profiles. The American and Canadian Profile Test,² Cornell Medical Center Profile Test,³ Yamshon,⁴ Rinzier and co-worker,⁵ and Hoberman⁶ have contributed to a better understanding and testing of performance. Most useful is the Hanman Test,⁷ which will be described later in detail. However, to simplify testing and to place it in the hands of the physiatrist or other physician with a small staff, the following form is outlined: A simple testing board is created, carrying the usual materials needed in testing activity. Performance is rated as yes, no, or different (this being the method carried out by the patient). In the check list, the major activities are listed as follows: toilet or personal hygiene, dressing, eating, bed, apparatus, ambulation, and general and household activities. When this information is presented to the lawyer, judge, and jury, the simplicity of terms and the demonstration of each performance are readily understood.

Electrical Sensing and Recording Methods. In the field of electronics, the physiatrist has combined the physiologic and physical methods in obtaining objective information with reference to the neuromusculoskeletal system. That process has proved invaluable in establishing and elucidating the scientific criteria of proof which should govern the just appraisal and disposition of every species of personal injury claim associated with lower motor neuron and muscle disease.

1. *Electromyography*: The electromyograph is used to convert muscle action potentials into visible and audible waves. Monopolar or coaxial needles convey the action potentials, amplified many times, to the electromyograph and then reproduce them in sight on a cathode ray oscilloscope and into sound through an audioamplifying system. Because of this high fidelity system, the entire observation can be recorded simultaneously on tape and played back at the needed time for further study. Photographs of the oscilloscope waves are frequently not admissible as evidence, but a recording on

tape, played back before the courtroom audience, serves to indicate clearly the pathologic processes. Its major use in medicolegal studies affords accurate determination of diagnosis and, many times, prognosis. In peripheral nerve lesions and injuries, root compressions, compensatory atrophy, and conversion mechanisms, the information is objective and direct. Many other applications are noted in the literature.⁸⁻⁹

2. *Pain Mechanisms:* Study of pain mechanisms has been controversial, but must be included in this discussion. Most studies have been for emotional tension which indirectly manifests itself through pain in somatic changes. In the polygraph recorder, which is being used currently in many psychopathological studies (at the Lafayette Clinic in Detroit), 17 simultaneous studies are made. The combination is that of a sphygmomanometer (blood pressure), dermohmeter (skin resistance), plethysmograph (peripheral circulation and vasospasm), electromyograph for determining muscle tension, electroencephalograph for the brain waves, and a respiration recorder for vital capacity and breathing volume. The experience of the observer in interpreting these findings has medico-legal significance, and is admissible as evidence of pain. Testing the sedation threshold by intravenous injection of amobarbital (Sodium Amytal) may be concurrently used with this apparatus (especially observed is the inflexion point in the electroencephalograph amplitude and in the disappearance of the tension curves in the electromyograph.) Pain and suffering are factors of legal award that all physiatrists should be aware of, and hence such observations should be made in as objective a method as possible, utilizing the combined method outlined.¹⁰

3. *Other Electrical Sensing and Recording Methods:* Other methods are mentioned to complete the armamentarium of the physiatrist in calling on objective testing. The electroretinograph, electrogastrograph, oximeter, and low-voltage testing are within the province of the specialist in physical medicine in dealing with traumatic medicolegal problems.

Evaluation of Physical Ability. The final summary test in determining patient disability and impairment is evaluation of physical ability. In the past, much emphasis has been placed on the percentage of disability. It is certainly more useful to establish disability and ability concurrently, and a more accurate evaluation for medicolegal purposes is thus permitted. The Hanman System lends itself to ready usage, overcomes the rating method, and uses the amount of physical fitness in evaluating ability. In the profile of physical ability, 80 factors are represented, covering all significant human activities be they industrial, commercial, recreational, social, domestic, or military, encountered in any environment, at any time. The actual time required for filling out the form is only a few minutes. Hence, it should be included in all examinations associated with medicolegal problems.

Comment and Summary

For many years, the evaluation of disability and impairment has been supervised medically through other specialties concerned with the management of disease and trauma of the neuromusculoskeletal system. During the past decade the physiatrist has developed many objective methods of evaluation and treatment which lend themselves to accurate and determinable measurement of disability and impairment. As a result of his unique position in medicine, he is being called upon more and more to evaluate the patient afflicted with trauma or induced disease involving various aspects of the muscles, tendons, joints, bones, nerves, and so on. In the philosophy of Law-Science, Smith¹¹ has been a strong advocate of bringing together the best medical and legal minds in the problems of physical or physiological impairment, both from the standpoint of evaluation of disability and impairment and for purposes of establishing medical rehabilitation as part of the total picture of the medicolegal award. In the preparation of tort cases where the claimant seeks damages for personal injuries caused intentionally or negligently by the defendant, and in workmen's compensa-

tion cases, physical medicine methods are invaluable and objective. In the more recent preparation of OASI disability evaluation, the physiatrist is almost specific in method. Rehabilitation science helps the defendant in personal injury action, in that permanent disability in comparable cases can be presented to indicate the true disability from a physical ability aspect. Equally, in plaintiff action, the logical processes of rehabilitation examinations indicate the true impairment and may include the aspects of pain and suffering as determined through objective means.

Physical medicine and rehabilitation, through active participation in law-science, can serve the medical person, the injured person, and the legal participants in personal injury. The iatrogenic symptoms, the lawyer-aggravated symptoms, are all part of litigation. Better understanding between the lawyer and the physician will minimize and attenuate those problems. Close cooperation will result in better results for the patient, discourage unnecessary litigation, result in early and more compatible settlement and make for earlier medical rehabilitation. This has been termed the Medico-legal Audit by Doctor Hubert Winston Smith, who notes that "lawyers usually can agree on the prospects of establishing liability once they have investigated the facts and the law. This will enable compromise negotiations . . . so handled, the device would bring medical deadlocks to scientific resolution."

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Our greatest glory is not in never
falling but in rising every time we
fall. ◇ Confucius

Effect of Marsilid on Depression and Apathy in Chronic Physical Illness

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● A double blind study of the effects of Marsilid (iproniazid) and a placebo was made upon 13 patients who had chronic physical illnesses accompanied by symptoms of depression, apathy, withdrawal, and lack of motivation for rehabilitation procedures. All patients received psychological tests and psychiatric evaluations during the six-week study period. No significant changes, qualitatively or quantitatively were found in any of the three groups; and it is concluded that Marsilid alone, in the dosage employed (100 mg. per day), and in the absence of all psychotherapeutic techniques, was of no significant value in the management of these conditions.

In view of the apparent success of Marsilid (iproniazid) in the treatment of psychiatric patients suffering from depressions, it was felt that this "psychic energizer" might also be quite useful as an adjunctive treatment in the management of chronically ill patients who showed manifestations of mild depression, fatigue, withdrawal, or lack of motivation due to apathy.

Method

Subjects were patients who had been continuously hospitalized for at least six months, whose conditions were relatively static, and who were considered to be depressed, apathetic, passive, withdrawn, or suffering from lack of motivation which interfered with their further progress. Thirteen cases were studied extensively. These were divided into an experimental group, a placebo group, and a control group.

Measurements. The Columbia Mental Maturity Scale was used as an index of intellectual capacity. As a brief index of personality, ten of the Rotter Incomplete Sentences and four of the Rorschach ink blots were administered. The quantitative measures on the two personality tests appear in table 1. Qualitative data were obtained from evaluation of the psychological tests by two clinical psychologists and by repeated psychiatric evaluations of the patients.

Procedure. Following the psychological and psychiatric evaluations, the experimental group was administered 100 mg. of Marsilid daily for six weeks, and the placebo group received identically appearing placebo tablets. The subjects were told only that they were getting a new drug which "might make you feel better." They were not told how the drug might work, nor were they told anything of its nature. All attempts at psychotherapy and suggestion were studiously avoided. No one connected with the study knew which tablets were Marsilid and which were placebos. Psychiatric evaluation was continuous throughout the study; and at the end of the study the subjects were re-evaluated by the same psychological tests.

Results

Table 1 shows the means and standard deviations of the changes observed in the three groups from pre- to posttreatment conditions. The table was derived by subtracting each patient's posttreatment psychological test scores from his own pretreatment scores to yield an index of change for each individual, and these indexes were then treated statistically to yield data regarding group tendencies. Although some of the main differences reported in this table appear very great, they fall within the standard deviation values and were found to fail of statistical significance at the 5 per cent level.

A second criterion was established by assuming that if Marsilid produced an energizing effect, the initial reaction time and rate of response to the ink blots and incomplete sentences would be decreased, whereas the number of responses per ink blot, number of words per response on

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the incomplete sentences, and score on the Columbia Mental Maturity Scale would be increased. Accordingly, each patient was assigned a score of +1 for every change in performance corresponding to these expectations and a score of -1 for every change in the opposite direction. The sums of these scores may be found in table 2 in the column headed "Objective Criterion." It is clear from this table that no definite correlations could be found between the research measures and the criteria.

Discussion

Ayd¹ and Crane² observe that any psychological changes which seem to occur as a result of therapy with Marsilid are in the direction of an exaggeration of the pre-existing personality, and that if Marsilid is to be effective, concurrent psychotherapy is necessary. In this study, all attempts at psychotherapy were studiously avoided. Perhaps much more important than the statistics are the observations made upon the individual patients. A study of these reveals that

Table 1: Posttreatment Changes in the Research Measures

	Marsilid Group (N = 5)		Placebo Group (N = 5)		Control Group (N = 3)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Rorschach measures*						
Initial reaction						
Time (secs.)	-5.4	6.8	-3.9	9.6	-3.9	9.7
Total time (secs.)	-2.3	30.8	-22.3	-33.6	-3.6	9.3
Number of responses	0.6	1.2	-0.2	-0.9	-0.6	1.0
Time responding	2.7	25.7	-22.9	-39.1	0.4	6.3
Rate of response	-9.4	15.0	-3.5	6.5	-14.9	27.4
Rotter Incomplete Sentences and Measures†						
Initial reaction						
Time (secs.)	-1.5	4.5	0.6	1.9	-2.3	2.9
Total time (secs.)	-1.7	5.0	-6.3	16.9	-2.8	4.7
Words per response	-0.2	1.2	-0.5	2.5	-0.5	1.0
Time responding	-0.2	1.3	-0.8	2.2	-1.6	-1.8
Columbia Mental Maturity						
Scale‡		5.0	2.6	3.6	6.8	12.0
Raw score	-3.4					

*Posttreatment minus pretreatment values in terms of averages per blot.

†Posttreatment minus pretreatment values in terms of averages per sentence.

‡Posttreatment minus pretreatment values.

Note — Although means and standard deviations are reported, nonnormality of distributions made use of nonparametric statistics necessary. None of the differences between groups exceeded the .05 level of statistical significance (see text).

Table 2: Comparison of Clinical Judgments and Expected Measurement Changes

Subject		Primary Medical Diagnosis	Combined Clinical Judgment	Objective Criterion
Age	Sex			
Marsilid group				
43	M	Multiple sclerosis	Improved	1
50	F	Multiple sclerosis	Improved	-1
43	M	Multiple sclerosis	Improved	2
74	M	Pyelonephritis; secondary anemia	Worse	3
29	F	Myasthenia gravis	No change	3
Placebo group				
41	M	Multiple sclerosis	No change	-3
69	F	Charcot joints anemia	Improved	5
57	M	Hip fracture	Improved	-1
64	M	Hip fracture	No change	3
46	M	Quadruplegia traumatic origin	No change	1
Control group				
44	M	Paraplegia spinal tumor	Improved	5
57	M	Hemiplegia, cerebrovascular accident (remote)	No change	2
20	M	Multiple leg and hip fractures	Improved	3

for every improvement, no matter in which group it occurred, some outside influence could be found to explain the changes, even in what we had hoped would be a stable environment.

Our study is too small to make the categorical statement that Marsilid is ineffective in the treatment of "pure" depressions; though we did find that in our double blind study in which attempts at psychotherapy and environmental manipulation were avoided, there was no greater improvement in the Marsilid group than in the placebo and control groups. It is also important to note that in 100 per cent of the patients who have appeared to improve in response to Marsilid, whether these be psychiatric patients or the patients in this study, there has been some other external factor operating which could also, in and of itself, explain the improvement. We feel that 100 per cent, even in a relatively small series, is a figure which cannot readily be ignored.

Perhaps what we have established here is that the depression and apathy often associated with chronic physical illness is different from the classical psychiatric depressions; though, again, we point to our figure of 100 per cent and recom-

mend that further controlled studies of the monamine oxidase inhibitors be performed.

Summary and Conclusions

A double blind study of the effects of Marsilid (iproniazid) and a placebo was made upon 13 patients who had chronic physical illnesses accompanied by symptoms of depression, apathy, withdrawal, and lack of motivation for rehabilitation procedures. All patients received psychological tests and psychiatric evaluations during the six-week study period. No significant changes, qualitatively or quantitatively were found in any of the three groups; and it is concluded that Marsilid alone, in the dosage employed (100 mg. per day), and in the absence of all psychotherapeutic techniques, was of no significant value in the management of these conditions.

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This study was conducted at Highland View Hospital, Cleveland.

Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.



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Perception in Hemiplegia: I. Judgment of Vertical and Horizontal by Hemiplegic Patients

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● The present investigation of judgment of the visual vertical and horizontal is the first in a series of reports concerned with perceptual functioning in hemiplegic patients. The results indicate that systematic alterations in the visual perception of the vertical and horizontal occur as important sequelae of the neurologic damage that results in hemiplegia. These results are discussed in terms of their implications for rehabilitation practice and their significance for neurologic and perceptual theory.

The dramatic motor consequences which so often attend damage to the central nervous system have quite naturally made alterations in motor functioning the focus of attention in hemiplegia. However, if one accepts the motor loss as a relatively irrevocable modification in functional capacity, the task of rehabilitating the hemiplegic patient becomes a problem in training him to utilize his residual motor abilities in ways which will permit a maximum degree of self-sufficiency and responsiveness to environmental demands. To approach the problem of re-education adequately, it is necessary to shift the focus of attention from motor loss to characteristics of the patient essential in retraining for functional motor reorganization.

A growing body of evidence strongly suggests that the reorganization of action patterns is dependent upon the ability of the learner to establish those new perceptual integrations from which new motor skills emerge. Contemporary experimentation makes it ever more apparent that the restructuring of afferent integration is crucial for the process of motor learning.^{1,2} Although some 50 years ago Pierre Marie and his students³ had already become concerned with the sensory and perceptual concomitants of those neurologic insults which result in hemiplegia, the recent clarification of the dependency of motor learning upon perception has provided a new urgency to the task of investigating the receptive alterations which accompany motor loss.

As a consequence of the increased

recognition of the intimate relationship between the perceptual functions of neurologically damaged patients and their problems in motor learning, a number of attempts have been made to explore some of the perceptual characteristics of hemiplegic patients.⁴⁻⁵ These studies have stressed losses in superficial and deep sensation as described recently in a paper by Van Buskirk and Webster. They noted a direct relation between the length of hospital stay and the severity of loss in such sensory modalities as touch, vibration, temperature, and two-point discrimination. Promising and thought provoking though these studies have been, they have not represented any systematic examination of the perceptual accompaniments of hemiplegia or related the contribution of these sensory losses to the problem of relearning.

Method

The perception of the visual vertical and visual horizontal was studied by asking the subjects to report when a rod which had been displaced from either the true vertical or the true horizontal was returned to a position which the subject judged to be "straight up and down" or "straight across." Judgments were made under two sets of conditions. In Condition I (dark), the patient was seated in a dark room 10 feet from a luminous rod, so that it was directly in front of him. The two tests, perception of the vertical and perception of the horizontal, were given during the same session, with a rest period of 5-10 minutes between tests.

After the experimenter was sure that the luminous rod was visible to the pa-

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Table 1: Characteristics of Patient Population Used in Study of Perception of Vertical and Horizontal in Dark

Group	N	Sex	Mean Age	Mean Duration of Illness	Mean IQ
Right hemiplegia	18	6 M 11 F	62 yrs.	3 yrs.	76
Left hemiplegia	17	8 M 9 F	68 yrs.	3 yrs.	91
Control	10	8 M 2 F	70 yrs.		88

tient, the patient was told: "I am going to move the rod. You say 'stop' when it appears straight up and down" (vertical test), or "You say 'stop' when it appears straight across" (horizontal test).

Vertical Test. The experimenter rotated the rod, starting 10 times from a position which was never less than 30 degrees clockwise from true vertical and 10 times from a position which was never less than 30 degrees counterclockwise from true vertical. The 20 trials were given with initial displacements in an *abba* order.

In the horizontal series the experimenter rotated the rod, starting 10 times from a position in which the left end of the rod was never less than 30 degrees above true horizontal and 10 times from a position in which the right end of the rod was never less than 30 degrees above true horizontal. All other features of procedure were identical with those used for the vertical series.

A second series of observations was made in Condition II (light), in which the subjects were asked to make judgments upon tasks identical with those presented under Condition I. However, in Condition II, the environmental illumination was maintained to resemble that normally encountered by the patients in adequately lighted atmospheres.

The apparatus used in these studies was an 18-inch rod covered with luminous paint and mounted on the 8½-inch diameter of a circular surface measured in degrees.

Subjects

A total of 57 patients was examined in these studies: 22 suffered from right hemiplegia, 21 from left hemiplegia, and 14 were control subjects. Under Condition I (dark), 18 right hemiplegic, 17 left

hemiplegic, and 10 control patients were studied. The controls consisted of individuals with musculoskeletal disabilities, but with no known central nervous system damage. It may be seen from table 1 that the right and left hemiplegic groups do not differ significantly from the control group with respect to their general intellectual level, and that the mean IQ of the left hemiplegic group is significantly higher than that of the right hemiplegic group.

The subjects in Condition II (light) consisted of 13 right hemiplegic, 12 left hemiplegic, and 10 control patients. Except for 4 in each subgroup, all were also subjects in Condition I.

Three of the right hemiplegics and 5 of the left hemiplegics exhibited significant constriction of the visual fields. The remaining subjects had essentially normal visual fields.

Results

The present study provides answers to certain specific questions:

1. Do patients with hemiplegia differ from a control group in their perception of the vertical and horizontal?
2. Does the side of the damage affect perception of the vertical and horizontal?
3. Are perceptions of vertical and horizontal related?
4. Does the ability to perceive coordinates in the dark differ from the ability to make similar judgments in normal illumination?

At least three criteria may be used in assessing perceptual judgments. Two of these, average error and constant error, represent comparisons of the individual's judgments with objective reality. The third, the variance or its derivative, the standard deviation, is an internal measure which describes the self-consistency

Table 2: Mean Values of Judgment Criteria of Vertical in Dark

Group	Constant Error	Average Error	Standard Deviation
Total hemiplegia	-1.90 \pm 4.16	4.72 \pm 3.11	3.91 \pm 2.26
Right hemiplegia .....	.10 \pm 3.08	3.71 \pm 2.41	3.19 \pm 1.29
Left hemiplegia	-3.89 \pm 4.10	5.74 \pm 3.37	4.64 \pm 2.73
Control	-.34 \pm .97	2.21 \pm 1.45	2.40 \pm 1.56

+ indicates CW deviation

- indicates CCW deviation

Table 3: Significance of Differences Between Mean Judgment Criteria of Vertical in Dark

Groups	Constant Error	Average Error	Standard Deviation
Hemiplegia/Control	p < .05	p < .01	p < .05
Right hemiplegia/Control	—	.10	—
Left hemiplegia/Control .....	.01	.01	.02
Right hemiplegia/Left hemiplegia .....	.01	.05	.07

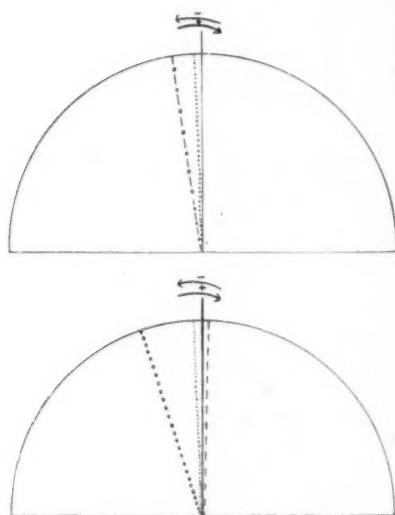


Fig. 1 and 1A — Mean directional deviations from objective vertical in dark. (..... Control Group; ——— Total Hemiplegic Group; ——— Right Hemiplegic Group; Left Hemiplegic Group.)

with which the subject is performing regardless of the degree of correctness or incorrectness of the responses. The average error permits us to obtain the mean of the individual's deviation from the objective vertical or horizontal independently of the direction of his errors. Constant error permits the measurement of directional tendency in judgment. The standard deviation provides an index of variability.

Perception of the Vertical in the Dark. The data in tables 2 and 3 indicate that

the hemiplegic patients performed less adequately in judging the true vertical than did the control subjects. Analysis of the constant errors, figures 1 and 1A, indicates that there was less agreement between the subjective and true vertical in hemiplegic patients than in the control group, a difference which is significant at the .05 level of confidence. The direction of the error is counter-clockwise for the hemiplegic group taken as a whole. However, this directional tendency was not universal in the hemiplegic population in our series, but was the result of a preponderant counter-clockwise tendency in the judgments of the left hemiplegics.

The right hemiplegic patients had a tendency to make clockwise errors in judgment and differed significantly (.01) in their constant errors from the patients with left hemiplegia. In figure 1A, the directional tendency in the judgments of the hemiplegic patients may be seen.

When the constant errors of our groups were compared, significant differences in judgments were found to exist between the left hemiplegic and both other groups. No significant difference was obtained between the right hemiplegics and the controls. The deviations from true vertical, independent of direction (average error), indicated a tendency for the performance of the right hemiplegics to be inferior to that of the control subjects.

When variability of performance was considered (standard deviation), the hemiplegics as a group were significantly

more variable than were the controls. Thus, consistency as well as accuracy of judgment was altered in hemiplegia. Subgroup differences are not statistically significant except that the left hemiplegics were more variable than the controls ($p < .02$), and tended to be more variable than right hemiplegics ($p < .07$).

Perception of the Horizontal in the Dark. The constant errors in horizontal judgment (tables 4 and 5) show that the hemiplegics as a group were significantly displaced from the true horizontal. The hemiplegics had a negative tendency in their judgments (fig. 2 and 2A), whereas the control subjects showed a mean positive tendency (fig. 2 and 2A). These differences were statistically significant ($p < .02$).

It may be seen in table 4 that our left hemiplegic patients as a group had a larger negative displacement than did either the right hemiplegics or the control subjects. The constant errors of the left hemiplegics differed significantly from those of both the right hemiplegics and controls ($p < .01$). However, the right hemiplegics showed a trend of difference from the controls (table 5). Figure 4 graphically indicates this trend.

The average errors indicate that the hemiplegics, considered as a whole, differed significantly from the controls ($p < .01$). Furthermore, the left hemiplegics in our series differed significantly in their performances from both the right hemiplegics and from the controls ($p < .01$). The right hemiplegics, when considered separately, also differed significantly from the controls ($p < .05$). Thus, when the magnitude of error independent of direction is considered, the hemiplegics as a whole and each hemiplegic subgroup differed significantly in the ability to judge the horizontal from the control group.

It was found that the total hemiplegic sample was significantly more variable in its judgments (standard deviation) than the control group ($p < .05$). The left hemiplegics were more variable than both the right hemiplegic and the control groups ($p < .05$, $p < .02$). However, the right hemiplegics did not differ significantly from the controls in variability.

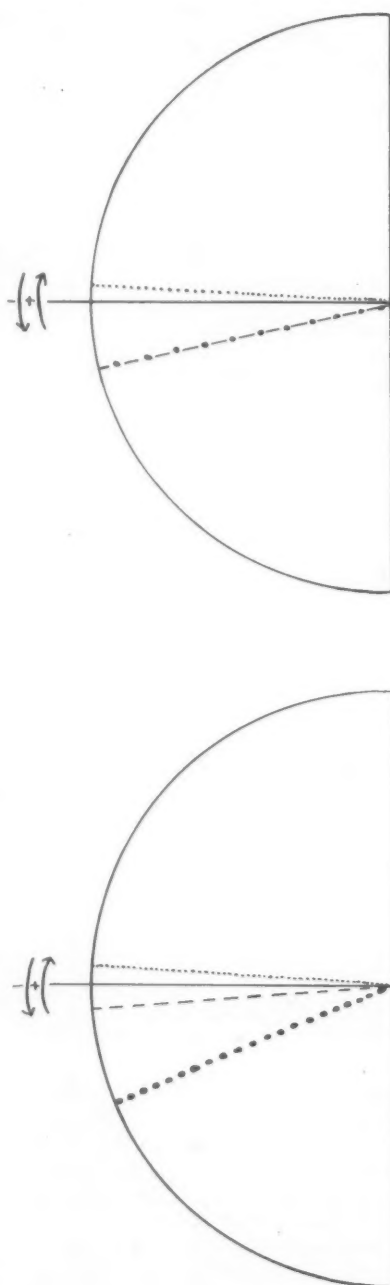


Fig. 2 and 2A — Mean directional deviations from objective horizontal in dark. (..... Control Group; ----- Total Hemiplegic Group; ——— Right Hemiplegic Group; Left Hemiplegic Group.)

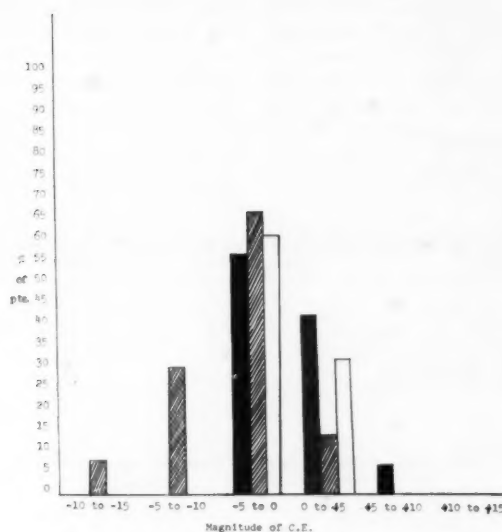


Fig. 3 — Distribution of constant errors in the perception of the vertical in the dark. (□ Control Group; ■ Right Hemiplegic Group; ▨ Left Hemiplegic Group.)

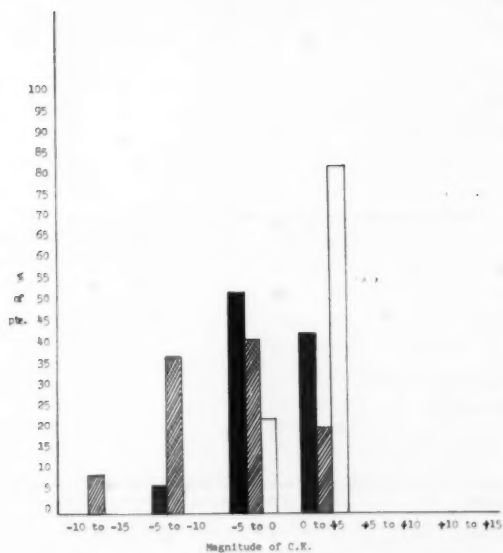


Fig. 4 — Distribution of constant errors in the perception of the horizontal in the dark. (□ Control Group; ■ Right Hemiplegic Group; ▨ Left Hemiplegic Group.)

Table 4: Mean Values of Judgment Criteria of Horizontal in Dark

Group	Constant Error	Average Error	Standard Deviation
Total hemiplegia	-2.77 \pm 4.42	5.19 \pm 3.45	3.64 \pm 2.84
Right hemiplegia	- .80 \pm 3.40	3.50 \pm 1.62	2.72 \pm 1.34
Left hemiplegia	-4.72 \pm 4.41	6.88 \pm 3.91	4.57 \pm 3.53
Control .....	.68 \pm .89	2.26 \pm .91	2.26 \pm 1.01

+ indicates CW deviation

- indicates CCW deviation

Table 5: Significance of Differences Between Mean Criteria of Horizontal in Dark

Groups	Constant Error	Average Error	Standard Deviation
Hemiplegia/Control	p < .02	p < .01	p < .05
Right hemiplegia/Control .....	.10	.05	—
Left hemiplegia/control .....	.01	.01	.02
Right hemiplegia/Left hemiplegia .....	.01	.01	.05

Table 6: Mean Values of Judgment Criteria of Vertical in Light

Group	Constant Error	Average Error	Standard Deviation
Total hemiplegia	-.21 \pm 1.11	1.35 \pm .61	1.43 \pm .85
Right hemiplegia	-.01 \pm .80	1.23 \pm .43	1.44 \pm .69
Left hemiplegia	-.40 \pm 1.11	1.48 \pm .78	1.42 \pm .99
Control .....	.07 \pm .80	.82 \pm .45	.72 \pm .38

+ indicates CW deviation

- indicates CCW deviation

Table 7: Significance of Differences Between Mean Judgment Criteria of Vertical in Light

Groups	Constant Error	Average Error	Standard Deviation
Hemiplegia/Control	p < —	p < .01	p < .01
Right hemiplegia/Control	—	.05	.05
Left hemiplegia/Control	—	.05	.05
Right hemiplegia/Left hemiplegia	—	—	—

Table 8: Mean Values of Judgment Criteria of Horizontal in Light

Group	Constant Error	Average Error	Standard Deviation
Total hemiplegia	-.58 \pm 1.09	1.25 \pm .95	1.30 \pm .63
Right hemiplegia	-.47 \pm .95	.96 \pm .43	.94 \pm .29
Left hemiplegia	-.66 \pm 1.21	1.55 \pm 1.20	1.67 \pm 1.09
Control	-.19 \pm .75	.88 \pm .47	.88 \pm .50

+ indicates CW deviation

- indicates CCW deviation

Table 9: Significance of Differences Between Mean Judgment Criteria of Horizontal in Light

Groups	Constant Error	Average Error	Standard Deviation
Total hemiplegia/Control	p < —	p < —	p < .05
Right hemiplegia/Control	—	—	—
Left hemiplegia/Control	—	.10	.05
Right hemiplegia/Left hemiplegia	—	—	.05

Relation of Perception of Vertical to Horizontal in the Dark. It was found that a close relation existed between the vertical and horizontal judgments made by our hemiplegics. The control subjects, however, showed independent directional tendencies in their judgments of vertical and horizontal. When the direction of error is examined it is found that 80 per cent of the right hemiplegics and 85 per cent of the left hemiplegics had directional agreement between their vertical and horizontal displacements. However, the nonhemiplegic controls exhibit only 40 per cent such agreement. The hemiplegics, therefore, showed a statistically significant (chi square $p < .01$) tendency to have directionally consistent deviation (+ + or - -) in their judgments of both planes.

Perception of Vertical and Horizontal in Normal Illumination. It is of practical and theoretical significance to assess the degree to which the obtained perceptual alterations persist under conditions of normal illumination. In tables 6 to 9 data on the judgment of vertical and horizontal by hemiplegic and control subjects are presented. It may be noted that under lighted conditions the differences between hemiplegic and control patients for the constant error in judgment disappeared. However, even though performance was better under illumination for all groups, the average error and standard deviation continued to affirm the existence of perceptual dysfunctions in the hemiplegic subjects. These data may be interpreted to mean that inaccuracy and inconsistency of spatial judgments are common to both the dark and illuminated conditions and that the experimental dark room conditions made this tendency more manifest.

Discussion

The brain-damaged patient must maintain physical activity in the face of a disruption resulting from impairment of sensory inflow. Visual perception serves as a major guide to spatial orientation and proper relationship of body parts. Disturbances in visual perception appear likely, therefore, to accentuate the total disability.

The present study indicates that hemiplegia is accompanied by aberrations in visual perception. Although the experiments reported here deal exclusively with the adequacy exhibited by hemiplegic patients in making judgments of the Cartesian coordinates, other data obtained in the study of depth perception, complex pattern perception, and judgment of the median plane suggest that, in a majority of patients with hemiplegia, visual perception as a whole is significantly modified. Consequently, the management, understanding, and retraining of the hemiplegic patient involves a consideration of the peculiarities of his visual world as well as of his motor dysfunction.

The fact of the displacement of the subjective vertical and horizontal from the objective vertical and horizontal is more comprehensible when the dependence of visual organization upon the stability of other sensory input is appreciated. Common experience with whirling and other vestibular stimulation readily exhibits this interdependence. Experimentally, the works of Asch and Witkin⁶⁻⁸ have shown that modifications of the kinesthetic, proprioceptive, and vestibular fields of stimulation result in marked alteration of visual orientation in space. It is not surprising, therefore, to find, as did Bruell and Peszczyński,⁵ that hemiplegic patients who may have altered organizations of proprioceptive and kinesthetic input exhibit disturbances in the structuring of visual space. While earlier studies have pointed to the phenomenon of disturbance, they have analyzed its characteristics in too limited a way and tended, because of small numbers, to pool their data and to avoid analysis of subgroup characteristics.

Three features of the visual perception of vertical and horizontal are altered in the hemiplegic patient: (1) accuracy, (2) directional shift, and (3) variability. In all three of these aspects of visual functioning the hemiplegic patients perform more poorly than do the control subjects. They are significantly less accurate and strikingly more variable in their judgments than are nonhemiplegic controls. However, the inaccuracy of the

hemiplegic patient is by no means random in character. The left hemiplegics in their perception of the vertical made errors which are preponderantly counterclockwise in direction. No such clear group direction is apparent in the right hemiplegics. Furthermore, there is a very marked consistency in the direction in which a given hemiplegic individual will deviate.

Whereas a control subject tends to make approximately equal numbers of randomly distributed errors in clockwise and counterclockwise directions, a given hemiplegic patient almost always makes errors which are nonrandom and have a direction of deviation characteristic for the individual. Thus, while hemiplegia increases variability in a patient's accuracy of judgment, it paradoxically contributes marked stability to the direction of distortion in which that error was made.

This suggests that the damage sustained has resulted in a given stable alteration of visual orientation in space that is a new and preponderant mode of function for each damaged individual. These alterations in perception are not simple reflections of alteration in intellectual capacity, since the group with greatest intellectual impairment (right hemiplegics) exhibits less perceptual difficulty.

It is of interest to note that the direction of errors in judgment in the vertical plane is not independent of the direction exhibited by a hemiplegic patient in his perception of the horizontal. A counterclockwise error tendency in the vertical plane is reliably reflected in directional errors in the horizontal plane. It appears that neither the vertical nor the horizontal axis is perceptually shifted, but rather a directional rotation of the entire subjective visual field has taken place. Thus, the rectangular relation of the vertical to the horizontal axis tends to be preserved and a rotation rather than a disruption of Cartesian coordinates takes place. Since the importance of visual orientation in the maintenance of the upright posture is well known, it is clear that directional disturbance of the visual vertical and visual horizontal

may function seriously to interfere with balance and thus with locomotion.

Although the results described are only part of a manifold study of perception in hemiplegia, certain clinical implications are apparent. It might well be that some of the failures in rehabilitation of the hemiplegic patients are related to disturbances in visual orientation. The patient responding to these disturbances may describe himself as dizzy or unbalanced and is looked upon as too apprehensive for rehabilitation.

Also, the success of some rehabilitation technics, such as the improvement in ambulation obtained by placing a lift in the shoe on the normal foot, may be related to influence on perception. Establishing procedures for measuring these disturbances may at least give us some understanding of the patient's problems and at best improve technics for achieving rehabilitation goals. However, a discussion of the general significance of the present findings to rehabilitation is best deferred until the results of our other studies of visual field organization in hemiplegia are presented, since perception of vertical and horizontal coordinates, depth, and median plane are all inextricably organized in the effective utilization of visual experiences for motor organization.

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✧
editorial
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A Vehicle of Thought

Symbols may be said to be visible and concrete pictorial expressions of man's endeavor to crystallize the known and imagined facts of the universe. One may go so far as to describe them as primitive stepping stones in scientific thought. Symbol in its broadest sense is a generic term which implies all that is meant by a sign, mark or token. The Greek word from which symbol is derived appears to have meant a bringing together. This definition is a logical antecedent of the modern explanation; for symbolism is a bringing together of ideas or objects, one of which expresses the other.

In the artistic use of symbols, it is essential that the object which forms the symbol shall be conventionalized to harmonize with the space it occupies so as to produce a felicitous unity. This "oneness" is embodied in the new and official seal of the American Congress of Physical Medicine and Rehabilitation.

The serpent entwined staff in the dexter side of the seal needs little or no explanation. Aside, it is interesting to note, that some researchers contend that the association of serpent worship with healing can be traced back to Phoenicia as well as to India, where the snakes which killed the plague-bearing rats were considered the Guardian of the Home. There is greater probability that the association of the serpent with the healing art arose, as the Greek themselves claimed, from the periodic sloughing of the skin of the serpent which suggested renovation. Whatever the cause the serpent was widely venerated in historic Greece for its healing powers and thus employed as a symbol for their physician-god of medicine, Aesculapius. Over the centuries from Roman times to the space age, the staff and serpent became a device widely adopted by physicians as the symbol of their profession.



The four circular symbols in the sinister side of the seal represent the four physical elements used as medication by Aesculapius, who well may be called the first physiatrist. Within the seal the blank circle represents fire; the circle bearing a triangular dot within its center represents air; the bisected circle represents water; and the quartered circle is symbolic of earth. The circle embodying the staff, serpent and the four individual symbols graphically delineates "being without beginning or end."

Hippocratic Greek shapes the seal of the American Academy of Physical Medicine and Rehabilitation with the key words *iatrike* and *analepsis*. The English word, "medicine,"

has an ambiguity which is not present in its Greek counterpart. The Greek term, "pharmakon," refers to the drug or physical object administered to a patient and "iatrike" refers to the art and science of medicine.



It was necessary then to employ an almost precise word which would serve as the equivalent medium of the modern sense of "rehabilitation." Hellenic Greek claims "epanorthosis," which is defined as restoration. It was used primarily by orators and statesmen to mean a restoration of social order, state or law.

It also means the restoration of the text of a manuscript and it is known that the Greek physician, Galen, used it in this sense. It is not an impossible term if one bears in mind that it involves translation from another sphere to the sphere of medicine. In Hippocratic Greek there exists the word, "analepsis," which means restoration both in the broad sense and as applied to a cure.

By action of the Board of Governors of each group at an interim meeting in 1958, the seals herein described and represented are the official hallmarks of the American Congress of Physical Medicine and Rehabilitation and the American Academy of Physical Medicine and Rehabilitation.

— Dorothea C. Augustin

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★ abstracts ★

Training Muscle Strength. E. A. Muller.
Ergonomics 2:216 (Feb.) 1959.

In this paper, the author briefly reviews Hettinger and his work on the rate of increase of muscle strength brought about by various training procedures, also showing how industrial fatigue could be avoided by single weekly maximum contractions of the muscles used in a particular job.

The rationale for the latter is based on Barcroft and Swan's work showing that isometric contractions of over 15 per cent of maximum tension prevent blood flow in the contracting muscle, thereby leading to fatigue. If the involved muscles could be doubled in strength, the tension within the muscle during the job would be halved allowing for more work to be done before the critical 15 per cent level of tension was reached.

The author also discusses the rates of atrophy and increase in strength and how these rates are affected by daily and weekly training.

Exercise and Heart Disease. K. W. Donald.
Brit. M. J. 5128:985 (April 18) 1959.

This lecture discusses several studies that the author has previously reported on the cardiac output of normal patients and patients with mitral stenosis, at rest and during supine leg exercise. The emphasis is on the regional distribution of the cardiac output under various circumstances.

Measurements were made by the technic of cardiac catheterization and venous and arterial blood sampling and calculations by application of the Fick principle.

The cardiac patients show little to no increase in cardiac output during exercise and achieve an increase in body oxygen uptake by a greatly increased extraction of O_2 from the blood.

Blood flow in the arm of cardiac patients at rest is reduced compared to normals and this reduction is confined to the skin while the muscle blood flow is relatively normal. During leg exercise in normals, muscle blood flow does not change while skin blood flow is reduced at first and subsequently increased. In the patients with mitral stenosis, skin and muscle flow in the arm decreases with leg exercise. The muscle flow remains low and the skin

flow increases, but at a later time and to a lesser degree than in normal subjects.

Splanchnic blood flow, as measured at the liver in cardiac patients, drops at a lesser level of exertion than in normals and remains low for a longer time even after exercise. The kidney blood flow response is similar to the splanchnic flow but the drop is less severe. The concomitant lower venous oxygen saturation in the liver and kidney area may be an important factor in liver and kidney function in these patients.

Blood flow in the brain is normal or slightly lower in the cardiac patients and remains unchanged during exercise.

The blood flow to the exercising legs in the patients with heart disease with relatively fixed cardiac outputs was 80 per cent of the flow in the normal subjects. This high value in these disabled patients was achieved by control of skin vasodilatation and by a considerable reduction in the flow to muscle not involved in exercises, and to the splanchnic area and the kidneys.

Transplacental Transmission of Western Equine Encephalitis. Stephen C. Coppers, and Luther E. Giddings. *Pediatrics* 24:31 (July) 1959.

The authors report on the laboratory findings and clinical course of an infant who had nuchal and lumbar rigidity associated with cyanosis, lethargy, jerking movements and generalized hypertonicity on the tenth day of life. History indicated that the delivery was uncomplicated and he had done well until six days of age.

The mother had had fever, headache, vertigo, insomnia and malaise starting approximately ten days prior to delivery and lasting for three or four days.

Serial hemagglutination titers for western equine encephalitis were interpreted as diagnostic in both mother and infant. The authors state that it is possible but highly unlikely that the infant might have been bitten by an infected mosquito on the first or second day of life in the newborn nursery since the incubation period varies from as short as four days to 21 days. A more likely explanation is transplacental transmission from the infected mother to the child.

Variations in Current Manual Muscle Training. M. M. Wintz. *Phys. Therapy Rev.* 39:466 (July) 1959.

The various technics currently in use in the manual muscle test were examined by means of a questionnaire survey covering 42 institutions and 22 states. Specifically, in this paper the differences in testing the anterior deltoid, serratus anterior, middle and lower trapezius, tensor fascia lata and internal rotators of the hip are discussed. No attempt is made to evaluate the different methods according to relative merit. The discussion is concerned with the kinesiology of the tests to point out the significant factors in comparison of grades.

Congenital Muscular Torticollis in Infancy. M. B. Coventry, and L. E. Harris. *J. Bone & Joint Surg.* 41A:815 (July) 1959.

Over a 10 year period 35 cases of congenital muscular torticollis were examined and treated. This group came from a population of 7,835 infants, 95 per cent of whom received care at a well-child clinic. Therefore, in this one city the incidence of congenital muscular torticollis was 0.4 per cent for the 10 year period.

The sternocleidomastoid tumor was discovered, on the average, 3.5 weeks after birth. The mass disappeared at the average age of 14 weeks. Facial asymmetry developed on the average at 10 weeks and disappeared at the average age of six months. Twenty-seven patients were treated with massage and stretching performed in most cases by the parents. Twenty-four of these had excellent results without surgery. Eight patients received no physical therapy and six had excellent results without surgery.

Of the five patients operated on, two had poor results and required reoperation. These two patients were not immobilized after surgery in the overcorrected position. Conservative treatment of congenital muscular torticollis is recommended until the patient is one year old. Surgical treatment may then be considered. It is suggested that surgery performed at any age between one and twelve years will produce equally good results.

Connective Tissue I. Age and Sex Influence on Protein Composition of Rat Tissues. Kung-Ying Tang Kao, and Thomas H. McGavack. *Proc. Soc. Exper. Biol. & Med.* 101:153 (May) 1959.

Tissues from various organs of male and female rats were fractionated into soluble protein, insoluble collagen, and elastin to determine the relation of age and sex to these proteins.

The data shows that, in tissues rich in scleroprotein (tendon and skin), there is a decrease in the amount of non-scleroprotein

and a concomitant increase in scleroprotein with aging. Also with increasing age, the percentage of soluble collagen in the scleroprotein fraction decreased and the amount of insoluble collagen increased. Elastin remained relatively constant in all tissues except tendon in which there was an increase with age.

The author's data indicates that the aging process (regarding changes in scleroprotein) occurs principally in tendons, skin, the uterus, and the aorta.

Care of the Elderly in Norway, Sweden and Denmark. Leon H. Goldberg. *Geriatrics* 14:35 (Jan.-Feb.) 1959.

The author gives a report of observations he made in the field of geriatrics on a study tour of the Scandinavian countries.

In these countries, 10-14 per cent of the population is over 65 years of age. Each country has met the problem of taking care of the elderly in its own fashion although there is great similarity in the way the problem is solved.

Through national pension and compulsory insurance against sickness and hospitalization the elderly have financial security, and great effort is put into housing for them and nursing homes for those who are sick. Along with this, research in geriatric medicine has taken place on a high level.

The way the problem is solved in the Scandinavian countries is of interest and will give inspiration to those concerned with the geriatric problems.

Delayed Neuropathy After Injury to the Cervical Spine in Children. Kenneth Zike. *Pediatrics* 24:413 (Sept.) 1959.

This is a report of two young children showing progressive neurologic changes occurring late after injury to the cervical spine. In both patients there was fracture of the odontoid process with failure of healing. Importance of neurological change, and especially cervical sympathetic abnormalities, is stressed.

Failure to demonstrate fractures in the roentgenograms is not adequate evidence unless the odontoid process and cervical facets are well demonstrated. The author concludes that persistent followup is essential, no diagnostic path should be neglected, and consultation should be undertaken freely with pertinent specialists, even when there appears to be a remission.

Electrodiagnostic Features of Distal Pathology in the Motor Unit. P. Bauwens. *Am. J. Phys. Med.* 38:144 (Aug.) 1959.

Electromyographic characteristics of the myopathies and neuropathies are well known. At times one finds the features characteristic

of both coexisting. In this paper, Bauwens reports the case histories of two patients where this was so and also discusses several other syndromes in which it might occur.

Degeneration of the motor nerve distally to its point of ramification, such as in a neuronitis, could give fibrillation potentials at rest and myopathic potentials during activity. The author has also seen this in polymyositis where there must be an extension of the inflammatory process from the muscle tissue proper.

In generalized toxic conditions Bauwens postulates that central affections of the motor neuron produces changes in the distal portion of its axon, i.e., an inadequate formation of axoplasm at the central end would result in a deficiency in some of the terminal arborizations of the anterior horn cell. Two case histories which support this thesis are presented.

The Otolaryngologic Aspect of Skin and Scuba Diving. G. D. Taylor. *Laryngoscope* 69:809 (July) 1959.

Aero-otitis, aero-sinusitis, and air embolism may develop in skin and scuba divers when pressure differences form respectively across tympanic membranes, sinus ostia and the larynx.

The skin diver is equipped with a face mask and a snorkel device (underwater breathing tube). When diving he holds his breath and air pressure in the lung assumes the level of the ambient water pressure. The scuba (self-contained underwater breathing apparatus) diver is equipped with a face mask and tanks of air under pressure. When the scuba diver descends, breathing continues and air is delivered from the lungs to the tank at the ambient water pressure.

Aero-otitis media develop in the skin and scuba diver if pressure on either side of the tympanic membranes is not equalized. If pressure differences are marked, rupture of the tympanic membranes can occur. When aero-otitis media develops the patient complains of pain and fullness in the ear; tinnitus, vertigo, and impairment of hearing may also occur. The wearing of ear plugs increases the danger of tympanic membrane rupture.

Aero-sinusitis will occur when pressure is not equalized across the ostia of the sinuses. The maxillary and frontal sinuses are more commonly affected.

Air embolism occurs only in scuba diving and during ascent. If the diver does not breathe on ascent air pressure in the lungs is maintained at a high level as external pressure is reduced. Alveolar rupture may then take place resulting in air entering the pulmonary blood vessels, and later the cerebral or coronary circulation to cause embolization. The same mechanism can cause pneumothorax and mediastinal and subcutaneous emphysema.

An extensive study of groups of amateur and professional divers is presented.

Motor Unit Territory in Different Human Muscles. Fritz Buchthal; Francesco Erminio, and Paul Rosenfalck. *Acta Physiologica Scandinavica* 45:72 (Jan. 30) 1959.

The purpose of the study was to determine the area of a motor unit in various muscles. A 12 lead multi-electrode was inserted perpendicularly to the fiber direction—if possible both anterior-posterior and medial-lateral. Eight different muscles were studied. A total of 79 muscles was investigated in healthy persons. The occurrence of a positive-negative deflection in the potential of less than 0.2 m/sec duration indicated the presence of active muscle fibers in the immediate vicinity of the recording lead.

It was found that the motor unit has an average diameter in the upper extremity of 5-7 mm., and in the leg muscles of 7-11 mm. Since 500 to 2000 fibers of a motor unit, when closely packed, occupy an area of 1-2 mm. diameter, 25 different motor units are represented within the area of a given motor unit. There were large variations of the territory and maximal voltage of the different motor units within a given muscle. There were no variations in territory and maximal voltage with age or development of the muscle.

Maximum voltage within the muscle unit increased linearly with the territory. Different average values of maximum voltage and territory in different muscles are interpreted in terms of differences in fiber concentration and total number of fibers per motor unit.

Aphasia in a Congenital Deaf-Mute. E. Douglass, and J. C. Richardson. *Brain* 82:68 Part I (Mar.) 1959.

This is a detailed report on the language disability and partial recovery following a left cerebrovascular accident in a 21 year old woman who was a congenital deaf-mute. Both finger spelling and sign language were involved, in addition to the expected reading and writing difficulties.

The authors conclude that the dominant hemisphere of a deaf-mute contains a language zone controlling the special modalities used by these persons. Their findings are of interest because they appear to be in contradiction of commonly held theories regarding area and type of loss in aphasia.

Prognostic Evaluation for Rehabilitation of Patients with Strokes. C. D. Bonner. *Geriatrics* 14:424 (July) 1959.

Major guideposts to consider in assessing the rehabilitation potential of patients with

strokes are discussed. These are subdivided into positive factors, negative factors, common pitfalls, and complications.

Positive features are a high level of previous physical activity, sufficient cerebral function to understand and follow directions, and to retain learned information, and sufficient motivation to want to achieve independence. The latter is usually assisted by initiating rehabilitation measures early; within a day or two after onset, so that a chronic dependency state is avoided.

Negative or handicapping factors are a high level of spasticity and neurologic involvement of the "good" side. Complications to avoid are bladder problems as a result of unnecessary or prolonged catheterizations, ischemic ulcers from improper bed positioning, and contractures from failure to provide full daily range of motion on the paralyzed side.

Most hemiplegic patients can, as a general rule, develop independence in ambulation and self care regardless of the amount of voluntary muscle function that returns provided their disability is attacked early.

Evaluation and Selection of Wheelchairs. B. H. Fowles. *Phys. Therapy Rev.* 39:525 (Aug.) 1959.

A basic outline of criteria in the selection of a wheelchair for a disabled patient is presented. This outline resulted after a three and one-half year experience in wheelchair selection for 253 patients at Highland View Hospital, Cleveland. The discussion concerns general selection, needs to consider with certain specific disabilities, and currently available modifications for special requirements. The objectives of wheelchair selection are maximum safety, comfort and independence.

Anterior Tibial Syndrome Due to Arterial Embolism and Thrombosis. Bernard J. Freedman, and C. H. R. Knowles. *Brit. M. J.* 5147:270 (Aug. 29) 1959.

The anterior tibial compartment is bordered by relatively rigid structures—the tibial, the fibula, the interosseous membrane, and the overlying fascia. This unyielding boundary surrounds the anterior tibial, extensor hallucis longus and extensor digitorum longus muscles as well as the anterior tibial artery, vein and nerve.

Conditions which cause a pressure elevation within the compartment may result in collapse of muscle capillaries or collapse of the anterior tibial artery and its branches. Ischemic necrosis of the muscles in the compartment and also ischemic neuropathy of the anterior tibial nerve will result. Pressure elevations may be caused by overexertion of the anterior tibial and toe extensor muscles resulting in edema; and local exogenous mechanical factors which

may increase pressure in the compartment such as an effusion associated with trauma or an infusion of fluid from a leaky vein cannulation. Thrombosis or embolism of the anterior tibial artery may also sufficiently reduce blood flow to the anterior tibial compartment and produce the same syndrome.

The syndrome regardless of the mechanism of production is highlighted by the appearance of sudden, severe pain in the anterior tibial compartment. The muscles become swollen, hard, and acutely tender on palpation and pain is aggravated on foot plantar flexion. The dorsalis pedis artery pulse may disappear but may later return after a few days. Paralysis of the anterior tibial muscle and the long toe extensor from ischemia results with a resultant foot drop. If the anterior tibial nerve is also involved a neuro-pathic paralysis of the extensor digitorum brevis and cutaneous anesthesia of the first inter-digital cleft is also seen.

Within a few hours after onset, there is a reddish-purple discoloration of the skin overlying the muscle bellies. Pain and tenderness persists and begins to subside in the next seven to 21 days. The end result may consist of a persistent induration with fibrous replacement of necrotic muscle tissue and continued paralysis, or neuropathy may disappear and regeneration of necrotic muscle fibers may take place with fairly good resolution. Early decompression via a long incision dividing the overlying fascia should be performed. When there is thrombosis or embolism vasodilators and anticoagulants may aid resolution. The author reports on five patients seen over a seven-year period with this syndrome. All five had some residual paralysis.

Therapeutic Application of Ultrasound in Physical Medicine. Justus F. Lehmann, and Frank H. Krusen. *Am. J. Phys. Med.* 37:173 (Aug.) 1958.

Ultrasound is of value in therapy if the production of heat is desired. In the dosages used for treatment no nonthermal effects are produced. Indications and contraindications are the same as for any other deep heating agent. High temperature elevations are produced at the interspaces between different kinds of tissue, hence nerve tissue and fibrous or scar tissue may be selectively heated.

Ultrasound is of established value in the treatment of peri-arthritis of the shoulder in conjunction with the standard massage and exercise program. Diseases which result in limitation of joint motion due to tightness or scar formation in periparticular structures may also be benefited. These conditions include immobilization after casting, rheumatic processes, and degenerative joint disease.

The dose of ultrasonic energy delivered to the patient depends upon the following factors: (1) the intensity of the sound energy

emitted per unit area of sound head (watts/cm.²); (2) whether the sound head is held stationary or is moving; (3) the temperature of the coupling medium, and (4) the length of time of treatment.

With a moving applicator, 0.5 to 3.0 watts/cm.² are usually applied. Temperature rises higher and more rapidly when the stationary head is used. Therefore, less than one watt/cm.² is used with a non-moving applicator.

A coupling medium is necessary to reduce reflection of energy from the air-skin surface. Mineral oil or water is equally suitable. The cooler the temperature of the medium with respect to the patient, the greater is the depth at which the temperature maximum occurs. In the pig thigh, dropping the temperature of the coupling medium 10 C. below skin temperature advanced the depth of maximum heating from 5 mm. to over 25 mm. Treatment time may vary from two to 15 minutes per treatment.

Relationship Between a Range of Tissue Temperature and Local Oxygen Uptake in the Human Forearm. III. Changes Observed After Anaerobic Work in the Post-exercise Period. David I. Abramson; Samuel Tuck, Jr.; Yvonne Bell; Carolyn Burnett, and Habib Rejal. *J. Clin. Invest.* 38:1126 (July) 1959.

The authors studied 14 healthy subjects between 21 and 34 years of age over a period of six hours each. A segment of forearm was placed in a water plethysmograph; the arterial circulation to the forearm was occluded and forearm exercise was performed after 90 minutes of exposure to constant water temperature of 45 or 28 to 30 C., following which the occlusion was released.

They demonstrated an early increase in arteriovenous oxygen difference during the initial portion of the postexercise period at both bath temperatures. They show a marked increase in blood flow as well. These two factors last for about two minutes, following which there is a much longer period of augmented circulation with normal or elevated oxygen content of venous blood.

The authors conclude, on the basis of their findings, that the oxygen debt is repaid more rapidly in muscles having higher temperatures. Extrapolation of this information to support the belief that pre-exercise "warm-up" for exercise in rehabilitation and in athletics, as the authors have done, is unwarranted, since so many other factors are involved.

Effect of Rhythmically Inflating a Pneumatic Cuff at the Ankle on Blood Flow in the Foot. R. Andrew Loane. *J. Appl. Physiol.* 14:411 (May) 1959.

Rhythmic inflation of a pneumatic cuff to 110 mm. Hg around the ankle of a seated subject reduces the venous pressure in the foot and thereby increases the rate of blood flow through the foot. The purpose of this paper is to determine whether this increase is greater than that expected from the resulting increase in the perfusion pressure as Allwood reported by using methods independent of volume change in the foot, i. e., heat flow and calorimetry as well as the usual plethysmography method.

The author's results with plethysmography were similar to those of Allwood. In seated subjects the mean percentage increase was 174 per cent while in horizontal subjects the mean increase of 2.5 per cent was not significantly greater than in the control limb. Using the heat flow and calorimetry methods the mean increases for the second five minute measuring period were 11.4 per cent and 26.2 per cent respectively.

Since the maximum increase in blood flow expected from increase in perfusion pressure is about 40 per cent there is obviously a discrepancy between these two means of measuring blood flow. The author feels the error lies in comparing the blood flow in the dependent "unmilked" limb, which would probably be too low, with the correct estimate of blood flow in the "milked" limb, thereby arriving at too high a value for the percentage increase on "milking."

It is concluded that the true increase in blood flow is more accurately reflected by the calorimetric and heat flow estimations which are probably proportional to the increase in perfusion pressure.

Spinal Cord Tumors in Children. Harold Haft; Joseph Ransohoff, and Sidney Carter. *Pediatrics* 23:1152 (June) 1959.

The authors review 30 patients, 15 years of age and under, with primary tumors within the spinal canal causing neurologic symptoms and signs and metastatic tumors in which these manifestations were the first indications. The review of signs and symptoms in this report produces very important information. Abnormality of gait and posture was one of the principal symptoms in 24 of the 30, with leg weakness and abnormal reflexes one of the signs in 23 of the 30.

Average duration of symptoms at time of diagnosis was one and one-half years. The subsequent course is described, indicating that the prognosis varies with the histological type.

This article is of significant interest to all concerned with cerebral palsy, poliomyelitis, psychiatric disease, or pediatric rehabilitation, since 25 diagnoses other than spinal cord tumor were made in this series prior to the establishment of the correct one by surgery or biopsy.

New Dietary Regimen for Arthritis; Value of Cod Liver Oil on a Fasting Stomach. C. A. Brusch, and E. T. Johnson. *J. Nat. M.A.* 51:266 (July) 1959.

A special dietary regimen which restricts water intake and administers cod liver oil on a fasting stomach produced major clinical and hematological improvement in arthritis and rheumatism at the Brusck Medical Center, in Cambridge, Mass. Restriction of all water intake to a single portion taken one hour before breakfast is an integral part of the treatment.

In a series of 98 patients who continued the regimen for six months, 92 (93%) obtained marked relief and 89 (90%) showed favorable changes in blood chemistry. The blood sedimentation rates dropped consistently from averages of 20 to 30 (Wintrobe) to normals of 0 to 12 within eight to 18 weeks. These findings provide an objective confirmation of the clinically observed reduction of the inflammatory process.

Intravascular agglutination with blood sludging is consistently found in arthritis. A comparison of the normal and arthritic patterns in the present study indicated that sludged blood resulting from positive intravascular agglutination may be an etiological factor. Cod liver oil taken on a fasting stomach was found to reduce blood sludging and also helped relieve the symptoms of arthritis. Blood chemical changes and clinical results suggest that adherence to the prescribed regimen on a long-term basis may produce sustained improvement in arthritis.

Venous Pressure, Emotions and Congestive Heart Failure. K. L. White; D. A. Martin, and C. R. Vernon. *J. Chron. Dis.* 10:163 (Sept.) 1959.

The literature indicates that the incidence of emotional trauma as a precipitating cause of congestive heart failure varies from 0.27 per cent to 76 per cent. The authors endeavor to clarify the influence of emotional trauma in causing congestive heart failure by studying central venous pressure and peripheral venous pressure in patients exposed to stressful situations.

Central venous pressure was studied in 22 patients, 17 of whom had a form of cardiac disease and five of whom were normal. Baseline central venous pressure determinations were made by vein catheterization. Central venous pressure changes under physical stimulation were obtained in order to evaluate better later determinations of the central venous pressure under emotional stimuli.

Emotional stimuli were obtained from the medical and social history of the patient's life. Stressful situations and normal situations were rephrased into questions which were asked of the patient. Increases in central

venous pressure of as much as 45 mm. of water resulted in successive response to emotionally charged questions.

Peripheral venous segment pressure was studied in six normals. Difficult mental arithmetic produced a highly significant increase in peripheral venous pressure compared to physical stimuli and simple mental exercises.

The relationships of emotional stimuli on peripheral venous tone and on central venous pressure to congestive heart failure are discussed.

An Evaluation of the Status of Vascular Disease. Benjamin B. Jackson. *J. Kentucky M.A.* 57:1047 (Sept) 1959.

Because of the nature of the disease, considerable time is needed to institute successfully a program in the management of atherosclerosis. Very often, in the interim, it is necessary to employ surgical technics. In this type of surgery, the flow of blood must be uninterrupted and adequate. If atherosclerosis is not present, successful reconstruction may be attained. If the vascular problem is recognized early enough and corrected, the outcome is satisfactory. Such vascular problems increase as the life span increases.

Contained Hostility in Rheumatoid Arthritis. Sidney Cobb. *Arthritis and Rheumatism.* 2:419 (Oct.) 1959.

In the many studies on the subject of rheumatoid arthritis, references to the importance of psychologic and social factors are becoming more numerous. It has been found that unexpressed or suppressed hostile feelings are associated with the disease. In talking with patients afflicted with rheumatoid arthritis, it is interesting to observe that prolonged anger "is likely to make their joints worse." Of the many personality problems of the rheumatoid, this seems to be the most prominent. Two interesting observations which have been made are rheumatoid arthritis is more common in the lower social classes and, among psychotic inmates of mental hospitals, there appears to be less of the disease than among the neurotics or in the general population.

Response of a Parasympathetic Neuroeffector System to Motor Nerve Stimulation. F. G. Carpenter, and F. C. Tankosley. *Am. J. Physiol.* 196:1185 (June) 1959.

This is a study of the relationship between the motor response of a multi-unit smooth muscle and certain experimentally varied conditions.

The experiment was carried out on a urinary bladder in situ of a female cat. The pelvic nerve was free. Intraperineal and bladder activity by reflex mechanisms was avoided by instillation intrathecally of procaine or alcohol at level L5. The bladder was filled with a measured volume of saline and the response of a nerve stimulus was measured by a strain gauge. It was found that with a stimulation from 0.5 to 30 impulses per second the tension of pressure is a hyperbolic function of the stimulation frequency. This characteristic is not altered by blockade of cholinesterase, or arrest of the bladder circulation. The graded response of the smooth muscle at different stimulation may be due to mechanical summation of individual "twitch" responses.

Optimal summation is reached with repetitive stimulation at rates 10 to 15 per second whereas the efficiency of mechanical summation in the smooth muscle diminished when the stimulation was below 5 per second. If the interval between the stimuli was increased to 200 milliseconds, a lower plateau of the summated response was reached. This may be due to the tendency of smooth muscle units to restore themselves independently of high ACH concentration.

Diet, Cholesterol and Atherosclerosis. Merritt H. Stiles, Roy T. Pearson, and Robert S. Johnson. *Northwest Med.* 58:1237 (Sept.) 1959.

While it is generally believed that a high-fat cholesterol producing diet is often the cause of cardiovascular disease mortality, there is reason to doubt this. Innumerable studies have been made by various methods and one of the findings is that vegetable oils affect cholesterol levels more than do animal fats. Vegetable oils, in fact, lower the level of cholesterol. By trimming all fat from meat, avoiding butterfat (whole milk, cream, butter, cheese, ice cream) and limiting intake of eggs, a significant drop in serum cholesterol is noted.

The Cardiac Patient in Underdeveloped Countries. S. Padmavati. *Am. Heart J.* 58:418 (Sept.) 1959.

Since data on mortality and morbidity from heart disease in underdeveloped countries is

not readily available, the author confines his remarks to India. Data in that country comes from three sources: (1) hospital statistics; (2) survey of distinct population groups, and (3) medical insurance agencies. It is found that deaths from heart disease form 7.7 per cent of medical causes of death covering all age groups. Among the types of heart disease were congenital, rheumatic, cor pulmonale, syphilitic, hypertensive, coronary and miscellaneous. Life expectancy in India is 32 years, as compared with 66-70 years in Western countries. Facilities are far from adequate and the cost of medical treatment is rising daily. Medical insurance does not exist. Among suggestions for improvement are improvement in medical relief measures; improvement of economic status of people by increasing production and use of birth-control, and increase in number of internists and cardiologists.

Value of a Department of Physical Medicine and Rehabilitation in a County Hospital. Stanley Olejniczak, and S. D. Jacobson. *J. Michigan M. Soc.* 56:1284 (Oct.) 1957.

Physical medicine and rehabilitation is recognized as an integral part of medical practice. Growth of the specialty accelerated during World War II when it became a major service in army hospitals and in other governmental institutions. There is a growing need to establish more departments of physical medicine and rehabilitation in institutions caring for the chronically ill and disabled. The increasing number of older people in our population makes the problem of the chronic disease more pressing. It seems extremely important to establish departments of physical medicine and rehabilitation in county hospitals, since the majority of patients are in the older age group and are chronically ill and/or disabled. Successful screening procedures and proper rehabilitation technics would reduce the cost of these patients and lessen the demand on the limited number of professional personnel. Rehabilitation can be successful in most severely disabled patients if a realistic program is planned with practical goals. Elderly patients who have gained physical independence can be sent home or to nursing homes, thus releasing beds for new patients.



★ book reviews ★

REHABILITATION IN INDUSTRY.
Edited by *Donald A. Covalt, M.D.* Cloth.
Price, \$6.00. Pp. 154, with illustrations.
Grune & Stratton, Inc., 381 Fourth Ave.,
New York 16, 1958.

This excellent monograph on industrial rehabilitation fills a long-felt need on the shelf of the industrial physician and the physiatrist as well as physicians with busy compensation practice. All of the chapters on industrial rehabilitation were written by outstanding contributors who have covered this large field with remarkable skill. The chapters on back injuries, amputations and spinal cord injuries are exceptionally well presented, and should be of great help in the management of some of the vexing problems of everyday practice. The emphasis on early referral is particularly commendable.

The chapter on vocational placement deals mainly with general problems. More specific information on the availability and utilization of community and vocational training resources would greatly enhance the practical usefulness of the next edition.

This book is recommended for those who are responsible for industrial and compensation medical programs, as well as medical practitioners and members of those paramedical disciplines whose work involves problems within the scope of industrial rehabilitation. (*M. M. D., M.D.*)

KINESIOLOGY, THE ANATOMY OF MOTION. By *Ellen Neall Duvall.* Cloth. Price, \$5.75. Pp. 292, with illustrations. Prentice-Hall, Inc. 70 Fifth Ave., New York 11, 1959.

This volume is a pleasure to read because of the simple and lucid writing style of the author, the beautiful and uncluttered illustrations by Helen Lorraine, and the very clear and readable type.

Quite obviously it is quite impossible to present a subject involving the description of motion and of complex motion at that by means of two dimensional words frozen into print. Except as supplementary guides and givers of examples then books probably cannot replace cinematic presentations of a subject like kinesiology, but even the moving picture screen is in two dimensions although succeeding with the aid of color and parallax in creating the illusion of depth.

It is ungracious and unnecessary to pick out minor flaws of syntax and inaccuracies of nerve supply for criticism, and this was left out by the reviewer.

This text is certainly recommended for both medical students and for physical therapy and occupational therapy students. The reviewer is very glad to have it in his library. (*Sedgwick Mead, M.D.*)

ANNUAL REVIEW OF MEDICINE.
Volume 10. Edited by *David A. Ryland.* Cloth. Price, \$7.00. Pp. 448. Annual Reviews, Inc., Stanford, Calif., 1959.

It has become increasingly difficult even for the internist to keep pace with yearly advances in medicine. The bewildering array of new knowledge in physiology and pathology is impossible to include in a publication of such size. However, the authors have been quite skillful in providing a general perspective of recent events together with a bibliography of the sources cited in this modest book.

The volume presents material delineating advances in: infectious diseases, gastroenterology, cardiovascular diseases (three chapters), nutrition, endocrinology (three chapters), allergy, and neoplastic diseases (two chapters). There are also excellent sections on: diseases of the nervous system, psychiatry, hematology, dermatology, pediatrics, respiratory system and environmental medicine.

Whenever possible, a brief historical summary is given. The amount of information presented is concise, but can be overwhelming if one attempts to read it continuously and without a sifting of the content. For example, the present concept of hypercholesterolemia and the mechanisms by which unsaturated fatty acids and analogues reduce plasma cholesterol, even though recent C¹⁴ studies have been most helpful, can be very confusing indeed. Also, the staggering literature on oral hypoglycemic agents although given in a profoundly digested form is still worthy of much study and necessarily cannot be other than briefly summarized here.

The authors are to be complimented on a difficult task well done. The volume, as its predecessors, is an important contribution and should be most valuable not only to internists and physicians interested in such a review, but also to all employed in research studies. (*Herbert Kent, M.D.*)

PRINCIPLES OF DISABILITY EVALUATION. By *Wilmer Cauthorn Smith, M.D.* Cloth. Price, \$7.00. Pp. 210. J. B. Lippincott Company, E. Washington Sq., Philadelphia 5, 1959.

The author, who is Chief Medical Adviser of the Oregon State Industrial Accident Commission, has gained a vast experience relative to disability evaluation of the patient who is treated under the laws of Workmen's Compensation. Since neuromuscular and musculoskeletal disabilities encompass activities with which physiatrists are concerned, the subject matter of this book should be of interest to our discipline.

The presentation of this book is in the traditional approach to disability, i.e., disability is viewed as loss of a part which has a particular cash value. However, the physiatrist is less interested in the anatomic loss than he is in the functional loss. This is an area that requires further study on the part of those in the field of physical medicine and rehabilitation.

The book is lucid and concise. It is divided into four sections. The first deals with the importance of disability evaluation and the relationship between the physician and the administration of such compensation. The second section discusses the nature of disability. The third concerns itself with the causal relationship between the disability and the job. The final section devotes itself to the evaluation of the disability.

The author makes a plea that more physicians be qualified to evaluate disability and that all physicians have at least a general knowledge of the nature of compensable disability.

Although this is a book in a highly technical area for those concerned with compensation or industrial medicine, there are implications relative to disability evaluation that warrant the attention of those in the field of physical medicine and rehabilitation to apprise themselves of this body of knowledge and to consider the development of new principles for disability evaluation. (*Jerome S. Tobis, M.D.*)

INSULIN TREATMENT IN PSYCHIATRY. Edited by *Max Rinkel, M.D.*, and *Harold E. Himwich, M.D.* Cloth. Price, \$5.00. Pp. 386. Philosophical Library, Inc., 15 E. 40th St., New York 16, 1959.

Differences of opinion regarding the value of insulin therapy (after about 30 years of use) has made this book unexpectedly interesting as well as informative.

Sakel inaugurated this method of treatment and it is considered as the "beginning of the biochemical approach to mental disease." It is also considered as one of, if not the "first of the effective therapies of schizophrenia." After the use of insulin therapy the psychosis was no

longer considered hopeless in the sense of an inevitable dementia.

As physiatrists, we are interested in insulin hypoglycemia, electric shock, tranquilizers and neuroleptics, since their use usually results in a widening interest in the dynamics of the schizophrenic patient and in "highly organized rehabilitation programs."

Others feel that the Sakel method must be supplemented by other treatments, such as reserpine, convulsive therapy, occupational therapy and psychotherapy. Group dancing and gymnastics were sometimes employed. This is a useful book for the physician working in a mental hospital. (*Jacob L. Rudd, M.D.*)

THE POSTURE PROBLEM UP TO DATE. By *May Goodall Darrow.* Cloth. Price, \$3.50. Pp. 94, with illustrations. Vantage Press, Inc., 120 W. 31st St., New York 1, 1959.

There are a few classics (e.g. *Basic Physical Training* by Margaret Morris and *Human Locomotion and Body Form* by Dudley Morton) and many good books related to posture and exercise. A new book on the subject, to justify its existence, must offer either something new and original, or it must improve on some older books. The present book does neither of these, and the theme of the text is an enigma. The descriptions of exercises are difficult to follow; illustrations, both drawings and photographs, are of poor quality. In addition to this, a number of statements contradict present day physiology, and yet, are unsupported by any experimental evidence. For example, "The true causes of overweight are poor oxidation and incomplete functioning, plus incorrect carriage. It is not so much the weight, as how it is carried that is important." Another example, "There is no anatomical justification for the so-called 'propulsive step', which lands on the heel and the weight shoved forward in a stilted artificial fashion, which leaves the calf muscles and the intrinsic foot muscles unused."

This book is not recommended. (*Michael Carpendale, M.D.*)

ELECTROMYOGRAPHIE DANS LES MALADIES NERVEUSES ET DANS LA CRYPTOTÉTANIE. Atlas D'Electromyographie. By *N. Rosselle.* Paper. Price, \$3.00. Pp. 159, with illustrations. Editions Nauwelaerts, 2 Place Cardinal Mercier, Louvain, Belgium.

The first 21 pages of this book describe the phenomena recorded by the electromyograph when the electrodes are inserted into normal muscle and the muscle is resting, or is contracted voluntarily, or is stimulated electrically. Forty-four pages are devoted to the records obtained from muscle affected by

various diseases, namely disorders of the peripheral nerves, idiopathic disease, myasthenia, myotonia, disease of the central nervous system, and cryptotetany. The last-named, of special interest to the author, is discussed in 12 pages on the basis of original observations in 227 patients. Cryptotetany is a condition without any characteristic symptoms, and the diagnosis depends on two things: the electromyogram, which unfortunately is indistinguishable from that of calciprival tetany, and the serum magnesium level which is significantly depressed (1.5 ± 0.24 mEq/liter) below the level found (2.0 ± 0.16 mEq/liter) in patients with normal electromyograms. The remaining 86 pages consist mainly of electromyograms obtained from 30 patients exemplifying various clinical conditions. The data regarding individual cases are meager. A commendable feature is a short section on artefacts. The book is recommended to physiologists, neurologists and physiatrists. (Frederic T. Jung, M.D.)

REHABILITATION MEDICINE. A TEXTBOOK ON PHYSICAL MEDICINE AND REHABILITATION. By Howard A. Rusk, M.D. Cloth. Price, \$12.00. Pp. 572, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1958.

The book consists of 27 chapters and 572 pages and is divided into two sections. In the first section, the senior author and his collaborators present their principles of rehabilitation. Some of the chapters are excellent and have appeared in more detail in previously published monographs, for example, the chapters on activities of daily living and training the disabled homemaker. Other chapters are less effective in their presentation, sometimes because of space requirements, other times because of a restricted approach.

Chapter 2 entitled "The Evaluation Process" concerns itself with diagnostic procedures. It is the longest chapter but lacks many features. For example, under the heading "Neuromuscular and Locomotor Systems," only one-half page is devoted to a discussion of gait, whereas over seven pages are used to describe measurement of joint range. Surprisingly enough, no mention of a sensory examination was made.

Chapter 3 entitled "Principles of Physical Medicine" is subdivided into only 1) thermal therapy 2) ultraviolet 3) electrotherapy and 4) massage. It is the reviewer's opinion that this restricted concept of physical medicine represents one of the serious weaknesses of the book. Bracing, therapeutic exercise, gait training, activities of daily living evaluation and training, as well as electrodiagnostic procedures, are just as surely the application of physical principles to the management of diseases as applying ultrasound.

Chapter 8 is an abbreviated version of the excellent monograph by Dr. Deaver on braces,

crutches and wheelchairs. In this chapter, on page 174, a sentence appears which is hardly consistent with a rehabilitation philosophy—"Many persons are so severely disabled they will never be able to ambulate with the aid of braces and crutches and are *doomed* (italics are mine) to spend the rest of their lives in wheel chairs."

The last chapter in the first section concerns itself with prescription writing. The sample prescription form on page 291 is poor. Much of the material here is repetitious. The ambiguous statement is made: "The minimum erythema dose is determined by the blanching of the skin after 24 hours." No mention is made how to prescribe the minimal erythema dose (m.e.d.). On page 293, the following statement appears: "The prescription for an exercise regimen is often so lengthy that it is impossible for the physician to write detailed orders for each and every patient." This seems all the more reason for the physician to prescribe exactly the program indicated.

The second portion of the book consists of 12 chapters describing the application of the principles mentioned in the first section to specific diseases or clinical syndromes. This approach leads to repetitions and contradictions, and in the reviewer's opinion, does not present the true dimension of physical medicine and rehabilitation. It would be preferable to categorize physical principles of management according to conditions resulting in disability, that is, joint limitation, muscle weakness, pain, amputation, incoordination, etc., rather than to specific disease entities.

An example of the artificiality of the method used is the overlap between Chapter 18 entitled "Rehabilitation of the Patient with Diseases of the Muscular and Neuromuscular Systems" and Chapter 19, "Rehabilitation of Patients with Neurologic Disorders."

The careful reader will be left with the impression that the book was hastily edited since there are more than the expected number of misspelled words, inaccuracies and poorly constructed sentences.

In Chapter 20, the discussion of complications of poliomyelitis, the author misuses the word "iatrogenic" in describing the inadvertent removal of the respirator from the power supply and failure to close the port hole. The 23rd edition of Dorland's Medical Dictionary defines iatrogenic as "a term applied to disorders induced in the patient by autosuggestion based on the physician's manner, actions or discussion." No mention was made of the role of catheterization in production of urinary infections, or of hypopotassemia as a cause of GI disturbances; or of hypercapnea and hypoxia in etiology of hypertension, or of value of a low calcium intake in the management of poliomyelitis.

The type is suitable for easy reading; charts, diagrams and photographs are excellent. The cover design is attractive, and the binding and pages are of good quality. All of

the chapters are documented with references, many of which are recent and authoritative.

The book can be summarized as a valuable contribution of the description of the principles, many original, of physical medicine and rehabilitation as used by the senior author and his colleagues. Paradoxically, it is this very quality which limits the book's value as a textbook; the hope expressed by the senior author in the preface. The text does not adequately present views and practices advocated by other clinics, some of which may represent majority opinion.

The book can be recommended as an introduction to the field of physical medicine and rehabilitation. It will serve as a single source of much valuable material previously unavailable within one cover. (*Ernest W. Johnson, M.D.*)

*Of the many things man can do
or make here below, by far the
most momentous, wonderful
and worthy are the things
called Books.*

— THOMAS CARLYLE

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Academy of Physical Medicine and Rehabilitation.



Let Reason Go Before Every Enterprise, and
Counsel Before Every Action. ♦ *Ecclesiasticus*

"The one-story intellect collects facts, the two-story intellect compares, reasons, and generalizes. But the three-story intellect idealizes, imagines, and predicts — with the best illumination coming through the skylight from above." ♦ *Oliver Wendell Holmes.*

* *medical news* *

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before date of meeting.

Newly Registered Therapists October 28, 1959

University of Connecticut

Roughgarden, Nancy Jane, 419 Squaw Brook Rd., Paterson, N. J.

Hermann Hospital

Baker, Kenneth L., 1618 Muscatine Ave., Iowa City
Bethel, Martha A., 3928 Southwestern, Houston, Texas
Cooper, Stanley B., 211 W. Robinson, Carmi, Ill.
Crawford, James P., Box 161, Grandfalls, Texas
Ecker, Roland K., c/o Mrs. Dorothy Terry, Willow, Alaska
Hopkins, Jencee E., 5702 Ridgedale Dr., Houston, Texas
Johnson, Odell, Jr., 423 Hazel St., Newport, Ark.
Kubes, Benjamin F., 115 1st St., S. W., New Prague, Minn.
McInnis, Judy Ann, 3349 5th St., Port Arthur, Texas
Meyers, Royce L., 308 N. Ave. "I", Lamesa, Texas
Walters, Michael N., 116 Pomeroy, Pasadena, Texas

St. Louis University

Goin, Patricia Ann, 1007 Holloway, Rolla, Missouri
Holzum, Sister Gerard Marie, 1100 Bellevue Ave., St. Louis

Stanford University

Williams, Heather A., 1854½ 12th St., Santa Monica, Calif.

University of Wisconsin Medical School

Osterberg, Richard D., Florence, Wis.

November 2, 1959

Bouve-Boston School

Upperman, Mae B., Edison House, 14 Edison Ave., Medford, Mass.

University of Colorado School of Medicine

Bauer, George E., Rt. 2, Box 254, c/o Graff, Scottsbluff, Neb.
Chamberlin, William D., 326 Harrison Blvd., Ogden, Utah
Clemons, Billy V., 1423 Navajo St., Denver
Deibler, Phyllis C., Box 313, Deertrail, Colo.
Geringer, Margaret E., Rt. 1, Box 96, Wheatland, Wyo.
Humble, Roberta B., 411 N. 15th St., Corvallis, Ore.
Johnson, Robert D., Alcester, S. D.
Kasten, Walter R., 3630 Grape St., Denver
Ritchey, Karen K., Rt. 2, Box 43A, Fort Lupton, Colo.
Skelton, Mary H., 1781 Roslyn St., Denver
Stenerson, Inez E., 315 Fifth Ave., W., Roundup, Mont.
Williams, Lloyd D., 1332 Ulster, Denver

Columbia University College of Physicians and Surgeons

Frank, Ann J., 53 Hawthorne Terr., Leonia, N. J.
Gunter, Patricia E., 3036 Kingsland Ave., Bronx, N. Y.
Leviton, Judith, 523 W. 187th St., New York City
Oothout, Nancy L., 5115 Waterbury Rd., Des Moines, Iowa
Parks, Travis B., 510 N. Adams St., Haure de Grace, Md.
Robb, Marcia, 751 Troy Ave., Brooklyn
Vander-Meyden, Joyce, 152 Minerva St., Syracuse, N. Y.
Verdon, Nancy Ann, 248 Claremont Rd., Ridgewood, N. J.

State University of Iowa College of Medicine

Belzile, Guy, 814 Orchard, Iowa City
Breed, Raymond J., Rt. 2, Inwood, Iowa
Bussell, Dale T., Hitchcock, S. D.
Coles, Sheridan Ann, 730 Michael St., Iowa City
Coryell, Jane F., Mounted Rte. 7, Michiana Park, Michigan City, Ind.
Hammer, Elizabeth A., Madison, S. D.
Hammond, Charles W., Potter, Neb.
Hannah, Patricia F., Box 216, Sturgis, S. D.
Hazelton, Frank T., 3883 Council St., N. E., Cedar Rapids, Iowa

Johnsen, Fritz E., 131 Stadium Park, Iowa City
 Kelsen, Ruth Marie, 1934 W. Estes Ave., Chicago
 Logan, Paul D., 116 Westlawn Park, Iowa City
 Mooney, Lawrence P., 1414 Boulder Ave., Helena, Mont.
 Niehaus, Donald P., Rt. 2, Grundy Center, Iowa
 Redenius, Myron E., Britt, Iowa
 Robinson, Jon R., Hepburn, Iowa
 Schneider, Paul D., 201 S. Sycamore St., Monticello, Iowa
 Troske, Frank H., Jr., Turton, S. D.

*Marquette University
 School of Medicine*

Costello, Kathleen H., 2026 Michigan Blvd., Racine, Wis.

*New York University,
 School of Education*

Byron, Marjorie Ann, 911 Maplewood Dr., Pittsburgh, Pa.
 Dorsey, Joseph A., Jr., 667 Union St., Springfield, Mass.
 Gordon, Linda G., 939 Carol Ave., Woodmere, N. Y.
 Grohe, Joan M., 8430 123rd St., Kew Gardens, N. Y.
 Huber, Albert C., 133 Cedar St., Hempstead, L. I., N. Y.
 Jenks, Barbara M., 382 Sharrotts Rd., Staten Island, N. Y.
 Marcus, Judith I., 130 E. 18th St., Brooklyn
 Pascarella, Edward A., 245 Treadwell St., Hamden, Conn.
 Ramirez, Nora Ann, 325 E. 21st St., New York City
 Rutan, Fred M., Rt. 2, Box 163, Monroe, N. Y.
 Siegelman, Stanley D., 1968 64th St., Brooklyn
 Subotnik, Joyce S., 508 Park Ave., Paterson, N. J.

*Northwestern University
 Medical School*

Boyer, Clifford L., 5554 N. Lakewood Ave., Chicago
 Buggs, Ulysses A., Jr., 404 N. Elm St., Mounds, Ill.
 Cook, George W., Jr., 5533 Rodgers Ave., Anniston, Ala.
 Cunningham, Raymond E., Jr., 14 Carson Lane, Bristol, Tenn.
 Ellingson, Roberta S., 2860 Kincaid, Eugene, Oregon
 Gilmore, Patricia L., 2975 Island View Dr., N. E., Salem, Ore.
 Kempenich, Sr. M. Veronica, St. Francis Convent, Little Falls, Minn.
 Knudsen, Janet L., 9219 S. Loomis St., Chicago
 Leary, Patricia Rae, 3865 N. 54th Blvd., Milwaukee
 O'Connor, Mary Patrice, 1521 E. 84th St., Chicago

Poole, Barbara Ann, 417 Burd St., Pennington, N. J.
 Sayoc, Lois Lee, 244 E. Pearson St., Chicago
 Zupan, Sr. M. Dorine, St. Francis Convent, Little Falls, Minn.

*Washington University
 School of Medicine*

Hughes, Texas Jo, 608 11th St., N. W., Albuquerque, N. M.

*University of Wisconsin
 Medical School*

Moegenburg, Corrine R., Gillett, Wis.
Army Medical Service School
 Clemenson, Shirley A., 75 W. Main St., New Concord, Ohio
 Derrick, Beverly, 301 Kalmia Dr., Columbia, S. C.
 Gray, Billie Ann, 121 N. Taylor St., Gunnison, Colo.
 Hubbard, Beverly Ann, 351 Fairway Lane, Kirkwood, Mo.
 Natrop, Carol M., Rt. 2, Box 262, Kaukauna, Wis.
 Pavlis, Patricia M., 1237 S. Cuyler Ave., Berwyn, Ill.
 Reed, Ruth A., 1159 S. Seventh St., Clinton, Ind.
 Tullos, Reeta G., Box 425, Chatham, La.
 Watkins, Martha L., 704 N. Three Notch St., Troy, Ala.
 Young, Sarah M., 39 Parkwood Dr., Savannah, Ga.

**Notices of Judgment Under the
 Federal Food, Drug and Cosmetic Act**

*Vitozone Ozone Generator Device
 shipped by Vitozone Co., Hollywood, Calif.
 (F.D.C. No. 40958. S. No. 73-821 M.)*

Results of Investigation: Examination showed that the article consisted of an electrically operated device, with glass discharge tubes capable of forming ozone in the atmosphere.

Charge: When shipped and while held for sale, the labeling accompanying the device contained false and misleading representations that the device was effective in the treatment of asthma, respiratory diseases, other illnesses due to breathing impure air, hay fever, heart disease, high blood pressure, sinusitis, arthritis, rheumatism, cancer, virus invasion, influenza, migraine, and cancerous tumors, and in promoting healing of wounds, calming nerves, and sharpening appetites.

Disposition: Default, delivered to the Food and Drug Administration.

*Bu-Methyl Pills and Haywood Pills
 in possession of
 Altone Chemical Co., New Orleans, La.
 (F.D.C. No. 40335. S. No. 53-170 M.)*

Results of Investigation: The pills contained in the bottles were repackaged by the consignee from a bulk drum.

Charge: The labeling accompanying the articles, while held for sale, contained false and misleading representations that the articles were effective to flush the millions of miles of kidney tubes, to flush out all waste and poisonous materials that the body couldn't use, to relieve backache, to prevent getting up nights, to overcome loss of sleep, and to furnish pep and energy.

Disposition: Default, destruction.

Dynamic Vibrator
shipped by Dynamic Mfg. Corp., Bronx, N. Y.
in possession of
Renhill Products Co., Newark, N. J.
(F.D.C. No. 41532. S. No. 30-181 P.)

Results of Investigation: Leaflets entitled "There's New Body Beauty" were prepared and printed at Newark, N. J., on order of the dealer, and other leaflets were obtained by the dealer from the shipper of the device. Examination of the device revealed that it was a vibrator powered by a single electric motor fitted with an elongated commutator shaft, eccentrically weighted to cause the motor to vibrate. The motor was contained within a small plywood box which was wrapped with a sponge-like plastic cushioning material covered with Duran plastic.

Charge: The labeling accompanying the article, when shipped and while held for sale, contained false and misleading representations that the article was an adequate and effective treatment for stimulating blood circulation, relaxing nervous tension, increasing body nutrition, improving general metabolism, relieving aches and pains from arthritis, rheumatism, lumbago, and bursitis, overcoming fibrositis, breaking down excess fatty tissue, overcoming muscular ailments, providing pep, vitality, comfort, and happiness, and being of value as a general body conditioner.

Disposition: Default, destruction.

Soy Lecithin
shipped from Portland, Ore.
in possession of Arthur E. Yensen,
t/a Yensen Mineral Co., Parma, Idaho
(F.D.C. No. 41514. S. No. 41-406 P.)

Results of Investigation: The article in bottles was repackaged by the dealer from a bulk drum, and leaflets were printed locally for use by the dealer in promoting the sale of the article.

Charge: The labeling accompanying the article, while held for sale, contained false and misleading representations that the article was effective for overcoming hardening of the arteries, anemia, high blood pressure, coronary thrombosis, arthritis, diabetes, liver conditions, prostate troubles, "brain fog," nervousness, emotional irritability, headache, insomnia, and improving the general health of older people.

Disposition: Default, destruction.

Hoffman's Soy Germ Oil, Wheat Germ Oil Concentrate, Hoffman's Energol Germ Oil Concentrate

shipped by York Barbell Co., York, Pa.
(F.D.C. No. 41518. S. Nos. 38-891/2 P.)

Charge: When shipped, the labeling of the articles contained false and misleading representations that the need in human nutrition for linoleic acid, choline, inositol, and vitamin E, contained in the articles, was recognized and established; that the use of the articles would insure a hormone balance in the body and build enzymes, would give one health, strength, and endurance; and would be effective in preventing or treating physical . . . weakness, arteriosclerosis, coronary thrombosis . . . Buerger's disease, gallstones cell production, cirrhosis of the liver . . . nervousness, anemia, epilepsy, difficulty in walking, pathological changes in the liver . . . shingles, arthritis, alcoholism, underactive pituitary glands, waddling gait, unusual sensitivity to pain, changes in the bone marrow, changes in the nodes . . . premature aging . . . coronary thrombosis, heart attacks, mental depression . . . tremors . . . trifacial neuralgia, sciatica, rheumatism . . . muscular and joint stiffness . . . coronary occlusion . . . paralysis . . . lack of coordination . . . edema, muscular dystrophy (sic), and strains.

Disposition: Default, destruction.

Film Awards

The International Rehabilitation Film Awards will be presented for the third time at the Eighth World Congress of the International Society for the Welfare of Cripples. The Congress is being held in New York City, August 28 to September 2, 1960. The awards are given for the best motion picture portraying aspects of services for the physically handicapped which has been released after August 1, 1957, and which is available for showing in 16mm. To be considered for an award, films must be received in New York City before July 1, 1960.

Information concerning the International Film Library and the International Rehabilitation Film Award can be secured from the International Society for the Welfare of Cripples, 701 First Avenue, New York 17, N. Y.

"World Neurology"

Inauguration of worldwide reporting of advances in the rapidly developing field of neurological sciences through the medical journal "World Neurology" was announced by the World Federation of Neurology (WFN), international group representing neurology societies in 42 nations. Scheduled for monthly

publication beginning July, 1960, "World Neurology" medical papers will be printed in four languages — French, German, English and Spanish. Editorial offices will be in the United States, and the journal will be published by Lancet Publication, Minneapolis.

Bibliography Aid

The U. S. Public Health Service has released a bibliography on cancer for use by nurses and nursing students. The publication includes lists of books and pamphlets; annotated audiovisual materials; teaching aids, such as prosthetic devices and other equipment for care of cancer patients; and annotated references on cancer of specific sites and nursing aspects of cancer. Prepared in the Field Investigations and Demonstrations Branch of the National Cancer Institute, the 38-page

publication contains more than 450 references. "Bibliography on Cancer for Nurses," Public Health Service Publication No. 687 (Bibliography Series No. 26), is available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents per copy.

Army Extends Bostrom Vibration Studies

The Surgeon General's office of the United States Army has increased to \$70,000 the total of contracts awarded to the Bostrom Research Laboratories of Milwaukee for vibration research. Bostrom Research Laboratories, center for advanced studies in vehicle vibration, was selected to conduct the experiments for the Army as an outgrowth of World War II experience.



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AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION

To stimulate interest in the field of physical medicine and rehabilitation, the American Congress of Physical Medicine and Rehabilitation will award annually, a prize for an essay on any subject relating to physical medicine and rehabilitation. The contest, while open to anyone, is primarily directed to interns, residents, graduate students in the pre-clinical sciences and graduate students in physical medicine and rehabilitation. The Awards and Prizes Committee suggests that members of the American Congress and American Academy of Physical Medicine and Rehabilitation bring this announcement to the attention of interested persons. The following rules and regulations apply to the contest:

1. Any subject of interest or pertaining to the field of physical medicine and rehabilitation may be submitted.
2. Manuscripts must be in the office of the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, not later than March 1, 1960.
3. Contributions will be accepted from interns, residents, graduate students in the pre-clinical sciences, and graduate students in physical medicine and rehabilitation.
4. The essay must not have been published previously.
5. The American Congress of Physical Medicine and Rehabilitation shall have the exclusive right to publish the winning essay in its official journal, the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION.
6. Manuscripts must not exceed 3000 words (exclusive of headings, references, legends for cuts, tables, etc.), and the number of words should be stated on the title page. An original and one carbon copy of the manuscript must be submitted.
7. The winner shall receive a cash award of \$200.
8. The winner shall be determined by the Awards and Prizes Committee of the American Congress of Physical Medicine and Rehabilitation.
9. All manuscripts will be returned as soon as possible after the name of the winner is announced.
10. The American Congress of Physical Medicine and Rehabilitation reserves the right to make no award if, in the judgment of the Awards and Prizes Committee, no contribution is acceptable. Announcement of the winner will be made at the annual meeting.

BERNARD M. BARUCH ESSAY AWARD—iii

Sponsored by the
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PHYSICAL MEDICINE
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*A*n annual award of \$100 will be given as a prize for an essay on any subject relating to physical medicine and rehabilitation.

The following rules and regulations apply:

1. Any subject of interest or pertaining to the field of physical medicine and rehabilitation may be submitted.
2. Manuscripts **must be** in the office of the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, not later than March 1, 1960.
3. *Contributions will be accepted from medical students only.*
4. The American Congress of Physical Medicine and Rehabilitation shall have the exclusive right to publish the winning essay in its official journal, the *Archives of Physical Medicine and Rehabilitation*.
5. Manuscripts must not exceed 3000 words (exclusive of headings, references, legends for cuts, tables, etc.), and the number of words should be stated on the title page. An original and one carbon copy of the manuscript must be submitted.
6. The essay must not have been published previously.
7. The winner shall receive a cash award of \$100.
8. The winner shall be determined by the Awards and Prizes Committee of the American Congress of Physical Medicine and Rehabilitation.
9. All manuscripts will be returned as soon as possible after the name of the winner is announced. The winning manuscript becomes the exclusive property of the American Congress of Physical Medicine and Rehabilitation.
10. The American Congress of Physical Medicine and Rehabilitation reserves the right to make no award if, in the judgment of the Awards and Prizes Committee, no contribution is acceptable. Announcement of the winner will be made at the annual meeting.

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Editor of the Month, DONALD L. ROSE, M.D., Kansas City, Kansas

